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UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

IN RE MICHAEL L. BEIGEL, NATHANIEL POLISH,
STEVEN R. FRANK, and ROBERT E. MALM

Appeal From The United States Patent and Trademark Office,
Board Of Patent Appeals And Interferences

BRIEF FOR APPELLANT

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February 27, 2007

1 of 14

CERTIFICATE OF INTEREST

UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

IN RE BEIGEL v. _____

No. 2007-1146

CERTIFICATE OF INTEREST

Counsel for the (petitioner) (appellant) (respondent) (appellee) (amicus) (name of party)

APPELLANT certifies the following (use "None" if applicable; use extra sheets if necessary):

1. The full name of every party or amicus represented by me is:

MICHAEL L. BEIGEL, NATHANIEL POLISH, STEVEN R. FRANK, AND ROBERT E. MALM

2. The name of the real party in interest (if the party named in the caption is not the real party in interest) represented by me is:

AVID IDENTIFICATION SYSTEMS, INC.

3. All parent corporations and any publicly held companies that own 10 percent or more of the stock of the party or amicus curiae represented by me are:

NONE

4. ☑ There is no such corporation as listed in paragraph 3.

5. The names of all law firms and the partners or associates that appeared for the party or amicus now represented by me in the trial court or agency or are expected to appear in this court are:

NONE

Feb. 4, 2007
Date

Robert E. Malm
Signature of counsel

ROBERT E. MALM
Printed name of counsel

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STATEMENT OF RELATED CASES

No other appeal in or from the same proceeding was previously before this or any other appellate court under the same or similar title, and there is no related case pending in this or any other court.

STATEMENT OF JURISDICTION

(a) The statutory basis for jurisdiction of the Board of Patent Appeals and Interferences is 35 U.S.C. § 134.

(b) The statutory basis for jurisdiction of this court to hear this appeal is 35 U.S.C. § 141.

(c) The appeal for review in this case is timely since it was filed within the time provided in 35 U.S.C. § 142 from the decision of the Board of Patent Appeals and Interferences on the Request for Rehearing mailed on October 26, 2006.

STATEMENT OF THE ISSUES

I. Whether claims 70,71, and 75 are unpatentable under 35 U.S.C. § 102 (e) in view of Carroll et al. (U.S. Pat. No. 5,517,194).

II. Whether claims 47, 56, and 57 are unpatentable under 35 U.S.C. § 103(a) in view of Carroll et al. (U.S. Pat. No. 5,517,194)

STATEMENT OF THE CASE

Appellants filed on July 8, 2002 an application for patent in the U.S. Patent & Trademark Office for an invention entitled *Electronic Identification System with Improved Sensitivity*, a division of application 08/262,157 filed on June 20, 1994 (now Patent No. 6,472.975 dated October 29, 2002).

In the office action dated January 15, 2004, the examiner finally rejected claims 1-17, 20-25, 32, 36-45, 47-68, and 70-80 and objected to all the others as being dependent on a rejected base claim. Appellants appealed to the Board of Patent Appeals and Interferences (BPAI) on April 9, 2004.

The BPAI Decision on Appeal sustained the examiner's rejections of claims 36, 39, 47, 56, 57, 58, 59, 60, 70, 71, and 75 and reversed the examiner's rejections of the remaining claims under appeal. Appellants requested a rehearing by the BPAI with respect to claims 36, 39, 47, 56, 57, 58, 59, 60, 70, 71, and 75, on July 18, 2005.

The BPAI Decision on the Request for a Rehearing reversed the decision to sustain the examiner's rejections of claims 36, 39, and 58-60. The BPAI maintained the examiner's rejections of claims 47, 56, 57, 70, 71, and 75.

A Notice of Appeal to the Court of Appeals for the Federal Circuit was mailed on December 5, 2006 appealing the rejection of claims 47, 56, 57, 70, 71, and 75.

STATEMENT OF THE FACTS

The invention is a radio-frequency (RF) identification system consisting of a reader and tag, the tag being attached to an object which can be identified by the tag responding to an interrogation by the reader.

- **reader generates alternating magnetic field**

In the preferred embodiment of the invention, the reader interrogates the tag by creating an alternating magnetic field embedded with a message in the vicinity of the tag. Specification, A54-A55, ¶ 30; A61-A62, ¶¶ 68-71.

- **reader embeds a reader-generated bit-timing clock signal together with data in the alternating magnetic field**

The reader embeds a message consists of an alternating sequence of "0's" and "1's" (which becomes as a result of the modulation process an embedded bit-timing clock signal) followed by a sequence of data bits. Specification, A63-A64,

¶ 82.

- **tag extracts bit-timing clock signal from reader's alternating magnetic field**

The tag senses the presence of the reader's alternating magnetic field by means of a coil. The reader's alternating magnetic field induces a signal in the coil which the tag demodulates to obtain a signal corresponding to the reader's message. In order for the tag to determine the value of a data bit, i.e. whether it is a "0" or "1", and to do it quickly and simply, it is necessary to know where each bit begins and ends. This timing information is provided by a bit-timing clock signal embedded by the reader in its alternating magnetic field. The sequence of "0's" and "1's" that precedes the data bits in the reader's message becomes as a result of the modulation process a bit-timing clock signal which takes on high and low values with the separation of bits being marked by the transitions between high and low values. Specification, A69-A70, ¶¶ 111-118.

- **tag generates bit-timing clock signal by dividing down in frequency the alternating-magnetic-field signal**

The embedded bit-timing clock signal ends when the alternating "0's" and "1's" end and the data bits start arriving. In order to continue to have bit-timing information while the data bits are being received, a continuing bit-timing clock signal synchronized with the embedded bit-timing clock signal must be generated

by the tag. The continuing bit-timing clock signal is generated by dividing down in frequency the alternating-magnetic-field signal induced by the reader's alternating magnetic field. Specification, A69-A70, ¶¶ 111-118.

- **tag syncs generated bit-timing clock signal with extracted bit-timing clock signal**

The bit-timing information supplied by the reader is preserved by a bit-timing clock signal generated by and caused to be synchronized with the bit-timing clock signal embedded by the reader in its alternating-magnetic-field signal.

The tag obtains its power to operate by extracting power from the reader-created alternating magnetic field. The time it takes for the tag to become fully powered is uncertain and therefore the start of the frequency-dividing-down process which results in the generated bit-timing clock signal is uncertain. Consequently, the high-to-low transitions of the generated bit-timing clock signal will not coincide with the high-to-low transitions of the embedded bit-timing clock signal which are fixed with respect to the alternating magnetic field in which it is embedded. If the generated bit-timing clock signal is to be used in identifying the data bits being transmitted by the reader, the generated bit-timing clock signal must be "synchronized" with the embedded bit-timing clock signal, i.e. a high-to-low transition of the generated bit-timing clock signal must coincide with a high-to-low transition of the embedded bit-timing clock signal. Specification, A69-A70, ¶¶

111-118.

- **tag identifies the data bits being transmitted by the reader using the generated bit-timing clock signal that has been synced to the extracted bit-timing clock signal**

After a tag begins to generate a bit-timing clock signal synchronized with the embedded bit-timing clock signal, it proceeds with the identification of the reader's message bits (which follow the alternating sequence of "0's" and "1's") utilizing the generated bit-timing clock signal in determining the beginning of each received message bit. Specification, A71, ¶ 122.

- **tag generates its own alternating magnetic field**

After the tag begins to generate its synchronized bit-timing clock signal and it determines that the reader is not transmitting data, it starts generating its own alternating magnetic field and transmitting data to the reader. Specification, A56, ¶ 39.

- **tag transmits data to reader in accordance with bit-timing clock signal that has been synced to the extracted bit-timing clock signal**

The tag transmits data to the reader in accordance with the generated bit-timing clock signal which was synchronized with the embedded bit-timing clock signal supplied by the reader. Specification, A71, ¶ 124.

- **reader identifies the bits being transmitted by the tag using the reader-**

generated bit-timing clock signal used to embed a bit-timing clock signal in reader's alternating magnetic field.

The reader has no difficulty in identifying the message bits being transmitted by the tag since the tag times the transmission of bits with the tag's generated bit-timing clock signal which has been synchronized with the bit-timing clock signal which was generated by the reader and embedded in the reader's alternating magnetic field. Specification, A58-A60, ¶¶ 56-60.

The examiner cites Carroll et al. as disclosing appellants' invention. Carroll et al.'s invention is a radio-frequency (RF) identification system consisting of a reader and tag, the tag being attached to an object which can be identified by the tag responding to an interrogation by the reader. Carroll et al., A846, col. 1, lines 22-45.

- **reader generates alternating magnetic field**

Carroll et al.'s reader (controller 10) initiates communications by creating an unmodulated alternating magnetic field and then waiting for a signal from Carroll et al.'s tag (transponder 40) which will enable the reader to "synchronize" to the tag and determine the identities of the message bits being transmitted to the reader by the tag. Carroll et al., A850, col. 9, lines 4-12.

- **tag generates bit-timing clock signal by dividing down in frequency the alternating-magnetic-field signal**

Carroll et al.'s reader-generated alternating magnetic field induces an alternating-magnetic-field signal in coil 42 in Carroll et al.'s tag (transponder 40). Carroll et al., A851, col. 11, lines 49-58. The alternating-magnetic-field signal is amplified by amplifier 58 and then is divided down in frequency by timing control circuit 60, a synchronous counter, which provides timing control signals Q1-Q12. Carroll et al., A854, col. 17, lines 39-52. The timing control signal Q6 is Carroll et al.'s self-generated bit-timing clock signal which is used to time the transmission of message bits to Carroll et al.'s reader (controller 10). Carroll et al., A854, col. 18, lines 23-57; A844, Fig. 5.

Carroll et al.'s tag (transponder 40) generates a bit-timing clock signal by dividing down in frequency the alternating-magnetic-field signal obtained from the reader-generated alternating magnetic field, but the reader does NOT embed in the alternating magnetic field a bit-timing clock signal to which the Carroll et al. generated bit-timing clock signal is synchronized. Note that in the first step of Carroll et al.'s process, only the "carrier power of the controller 10" is turned on. Carroll et al.'s reader has no bit-timing clock signal that it could embed in the "carrier" at this point in the process.

- **tag generates its own alternating magnetic field**

Carroll et al.'s tag (transponder 40) creates its own alternating magnetic field using the Q1 timing control signal in response to the unmodulated alternating magnetic field established by Carroll et al.'s reader (controller 10). Carroll et al., A852, col. 13, lines 28-42.

- **tag embeds its bit-timing clock signal together with data in its alternating magnetic field by transmitting a Manchester-encoded "configuration word" beginning with four "0's" followed by a "1"**

Carroll et al.'s tag (transponder 40) transmits a Manchester-encoded "configuration word" beginning with four "zero" bits followed by a "one" start bit as PSK modulation of Carroll et al.'s tag-established alternating magnetic field (A852-A853, col. 14, line 60 - col. 15, line 5; col. 15, lines 54-56), the configuration word being converted into a Manchester-encoded signal utilizing the timing control signal Q6, Carroll et al.'s bit-timing clock signal. The Manchester encoding of the first four "zero" bits of the configuration word results in the tag's alternating magnetic field being modulated with four cycles of the bit timing clock signal.

Line coding (e.g. Manchester line coding) is the process of converting or coding sequentially transmitted abstract symbols (such as "0" and "1") into real, temporal waveforms. Manchester line coding converts a "0" into a square wave

that is negative during the first half of a bit period and positive during the second half. *The Communications Handbook*, Editor-in-Chief Jerry D. Gibson, CRC Press, Inc. Boca Raton, FL (1987) p. 386-394. A Manchester-encoded sequence of 4 "0's" results in a square wave having a frequency equal to the bit rate.]

- **reader extracts the bit-timing clock signal from tag's alternating-magnetic-field signal**

Carroll et al.'s reader (controller 10) detects and decodes the four cycles of the bit-timing clock signal at the front end of the configuration word transmitted by Carroll et al.'s tag (transponder 40). Carroll et al., A853, col. 15, lines 56-59.

- **reader identifies the bits in the "configuration word" being transmitted by the tag using the extracted bit-timing clock signal.**

Carroll et al.'s reader utilizes this extracted bit-timing clock signal that was embedded in the tag's alternating magnetic field in decoding the configuration word. Carroll et al., A853, col. 15, lines 56-67.

- **reader embeds in reader's alternating magnetic field a "command word" in bit for bit synchronism with data received from tag, the command word beginning with four "0's" and a "1", the four "0's" not translating into an embedded bit-timing clock signal since Manchester encoding is not employed by the reader in transmitting data;**

Carroll et al.'s reader (controller 10) transmits a "command word" to

Carroll et al.'s tag (transponder 40) in bit for bit synchronism with the data being received from transponder 40, the command word incorporating the four "zero" bits followed by the "one" start bit received from the transponder. Carroll et al., A853, col. 16, lines 1-10, 46-52.

The message bits transmitted by Carroll et al.'s reader (controller 10) are not Manchester encoded and consequently, the four "zero" bits do NOT translate into the bit-timing clock signal as a result of the transmit process The synchronization logic bits D0-D3 transmitted by controller 10 are a repetition of synchronization logic bits D0-D3 transmitted by transponder 40. Controller 10's synchronization bits do not result in the embedding of a bit-timing clock signal in controller 10's carrier because the controller 10 does not use Manchester line coding in transmitting data. To transmit a "0", controller 10 transmits a carrier having a frequency of 125 kHz for the entire bit period. To transmit a "1", controller 10 transmits a carrier having a frequency that shifts from 125 kHz to 116.3 kHz and back during a bit period (Carroll et al., A853, col. 16, lines 52-55). See also A841, Carroll et al.'s Fig. 2H, step 348, which indicates that the "toggle carrier at 116.3 kHz for 1/2 bit" step 350 is bypassed when a "0" is being transmitted. Carroll et al., A851, col. 11, lines 11-26.

The transmission of the synchronization block consisting of 4 "0's" results in the transmission of a carrier having a frequency of 125 kHz for the entire 4-bit

period. Since a 125-kHz carrier is being transmitted at this point in the process, the transmission of 4 "0's" is simply a continuation of this transmission of a 125-kHz carrier. There is no bit-timing clock signal which would identify the beginnings and endings of message bits. Carroll et al., A849, col. 7, lines 22-39.

- **tag identifies the data bits being transmitted by the reader using the bit-timing clock signal generated by tag**

Carroll et al.'s tag (transponder 40) extracts data from the alternating magnetic field created by Carroll et al.'s reader (controller 10) using its own bit-timing clock signal Q6. Since Carroll et al.'s reader data was transmitted in bit for bit synchronism with the data received from Carroll et al.'s tag, there was no need for Carroll et al.'s reader to embed a bit timing clock signal in its transmission to Carroll et al.'s tag and it did not.

Appellants' and the Carroll et al. communication processes both achieve the same objective which is to equip both reader and tag with the same bit-timing clock signal. Appellants achieve the objective by the reader embedding a bit-timing clock signal in the alternating magnetic field created by the reader. Carroll et al. achieves the objective by the tag embedding a bit-timing clock signal in the alternating magnetic field created by the tag.

Five of the six claims under appeal include a limitation pertaining to a reader embedding a bit-timing clock signal in an alternating magnetic field:

- claim 70 - [a method for interrogating a tag comprising the step] embedding a bit-timing clock signal in the alternating magnetic field;
- claim 71 - [a method for interrogating a tag comprising the step] generating an alternating magnetic field in which the bit-timing clock signal is embedded;
- claim 75 - a bit-timing signal being embedded in the alternating magnetic field by the reader;
- claim 47 - the reader embedding a bit-timing clock signal in the transmitted signals;
- claim 56 - the reader transmitting a bit-timing clock signal to the tag.

The conceptual basis for bit synchronization between reader and tag for appellant's and Carroll et al.'s inventions is completely different. The only embedding of a bit-timing clock signal in the Carroll et al. invention is accomplished by the tag after the tag has been interrogated by the reader which is very different from the embedding limitations of the five claims identified above.

SUMMARY OF ARGUMENT

Appellants' argument is most conveniently discussed in the context of the steps performed by appellants' and Carroll et al.'s readers in interrogating the

associated readers as shown below:

Step 1: Appellants' reader generates alternating magnetic field;

Carroll et al.'s reader generates alternating magnetic field;

Step 2: Appellants' reader embeds a reader-generated bit-timing clock signal together with data in the alternating magnetic field;

(No corresponding step by Carroll et al.'s reader.)

Step 3: Appellants' tag extracts bit-timing clock signal from reader's alternating magnetic field;

(No corresponding step by Carroll et al.'s tag.)

Step 4: Appellants' tag generates bit-timing clock signal by dividing down in frequency the alternating-magnetic-field signal;

Carroll et al.'s tag generates bit-timing clock signal by dividing down in frequency the alternating-magnetic-field signal;

Step 5: Appellants' tag syncs generated bit-timing clock signal with bit-timing clock signal extracted in Step 3;

(No corresponding step by Carroll et al.'s tag.)

Step 6: Appellants' tag identifies the data bits being transmitted by the reader using the generated bit-timing clock signal that has been synced to the extracted bit-timing clock signal in Step 5;

(No corresponding step by Carroll et al.'s tag.)

Step 7: Appellants' tag generates its own alternating magnetic field;

Carroll et al.'s tag generates its own alternating magnetic field;

Step 8: Appellants' tag transmits data to reader in accordance with bit-timing clock signal that has been synced to the extracted bit-timing clock signal in Step 5;

Carroll et al.'s tag embeds bit-timing clock signal generated in step 4 together with data in its alternating magnetic field by transmitting a Manchester-encoded "configuration word" beginning with four "0's" followed by a "1";

Step 9: (No corresponding step by appellants' reader.)

Carroll et al.'s reader extracts the bit-timing clock signal from tag's alternating-magnetic-field signal;

Step 10: Appellants' reader identifies the bits being transmitted by the tag using the reader-generated bit-timing clock signal used in Step 2 to embed a bit-timing clock signal in reader's alternating magnetic field;

Carroll et al.'s reader identifies the bits in the "configuration word" being transmitted by the tag using the extracted bit-timing clock signal obtained in Step 9.

Step 11: (No corresponding step by appellants' reader.)

Carroll et al.'s reader embeds in reader's alternating magnetic field a "command word" in bit for bit synchronism with data received from tag, the command word beginning with four "0's" and a "1", the four "0's" not translating into an embedded bit-timing clock signal since Manchester encoding is not employed by the reader in transmitting data;

Step 12: (No corresponding step by appellants' tag.)

Carroll et al.'s tag identifies the data bits being transmitted by the reader using the bit-timing clock signal generated by the tag in Step 4.

Appellants' invention is claimed by combinations of the following limitations in six claims.

- ***reader embedding bit-timing clock signal in alternating magnetic field*** - (a limitation included in claims 70, 71, 75, 47, 56);

This limitation corresponds to Step 2 of the Statement of Facts. There is no disclosure of this limitation in Carroll et al.

- ***tag generating bit-timing clock signal synchronized with embedded bit-timing clock signal*** - (a limitation included in claims 71, 75, 47, 56);

This limitation corresponds to Steps 3, 4, and 5 of the Statement of Facts. Carroll et al. discloses generating a bit-timing clock signal but does not

disclose this signal being synchronized with a bit timing clock signal embedded in the reader's alternating magnetic field.

- ***tag extracting data from reader's alternating magnetic field utilizing tag's bit-timing clock signal that is synchronized to the embedded bit-timing clock signal*** - (a limitation of claim 47);

This limitation corresponds to Step 6 of the Statement of Facts. Carroll et al. does not disclose this limitation.

- ***tag embedding data in tag's alternating magnetic field in accordance with bit-timing clock signal synchronized with embedded bit-timing clock signal*** - (a limitation of claims 71, 75, 56);

This limitation corresponds to Step 8 of the Statement of Facts. Carroll et al. does not disclose the portion of the limitation "in accordance with bit-timing clock signal synchronized with embedded bit-timing clock signal."

- ***tag embedding data by causing the phase of the alternating magnetic field to have a first phase when a "0" is being transmitted and a second phase when a "1" is being transmitted*** - (a limitation of claim 57).

This limitation has to do with a specific modulation technique for embedding data in the tag's alternating magnetic field (see Step 8 of the Statement of Facts). This modulation technique is not disclosed by Carroll et al.

- ***reader extracting data from tag's alternating magnetic field utilizing reader-generated bit-timing clock signal*** - (a limitation of claim 71).

This limitation corresponds to Step 10 of the Statement of Facts. Carroll et al. discloses extracting data from a tag's alternating magnetic field utilizing an accompanying bit-timing clock signal embedded by the tag in its alternating magnetic field rather than utilizing a bit-timing clock signal generated by the reader.

The ***reader embedding bit-timing clock signal in alternating magnetic field*** is the key limitation which provides the foundation for all of the other limitations. The **STATEMENT OF FACTS** shows that the Carroll et al. invention does not involve a bit-timing signal being embedded in the alternating magnetic field of the reader.

ARGUMENT

STANDARD OF REVIEW

The appropriate standard of review is the "substantial evidence" standard. See 5 U.S.C. § 706(2)(E).

I. Whether claims 70,71, and 75 are unpatentable under 35 U.S.C. § 102(e) in view of Carroll et al. (U.S. Pat. No. 5,517,194).

CLAIM 70

Claim 70 reads as follows:

70. A method for interrogating a tag comprising the steps:

generating an alternating magnetic field;

embedding a bit-timing clock signal in the alternating magnetic field;

embedding data to be communicated to a tag in the alternating magnetic field.

Carroll et al. does not disclose the limitation in boldface. Carroll et al. interrogates a tag by creating an unmodulated alternating magnetic field having a fixed frequency of 125 kHz which continues to be unmodulated until the tag supplies a bit-timing clock signal to the reader, at which time the reader begins to frequency-modulate its alternating magnetic field with data-bit signals where the

data-bits are timed to be transmitted in bit for bit synchronism with the bits being received from the tag. The data transmitted by Carroll et al.'s reader is not and need not be accompanied by a bit-timing clock signal since the data bits are transmitted in synchronism with the arriving tag bits and the start times of the reader bits will be known by the tag and will easily identifiable as a result.

The only thing that Carroll et al.'s reader (controller 10) ever embeds in its alternating magnetic field is a "command word" and this occurs after Carroll et al.'s reader has interrogated for tags, has obtained a response and data from a tag in its vicinity, and now wants to send data to the tag. Carroll et al. describes the process of sending data to the tag as follows:

> "With additional reference now to FIG. 4B, an associated controller 10 either reads from, or writes to, the non-volatile memory 48 of the transponder 40 by sending a command word 112. The command word 112 is transmitted in bit for bit synchronization with the configuration word 100 or any data being sent from the transponder 40 to the controller 10. **The command word 112, therefore, incorporates a corresponding synchronization block 114 comprising logic level zero bits D0-D3 followed by a logic level one start bit 116 comprising bit D4 of the command word 112.**" Carroll et al., A853, col. 16, lines 1-10 (emphasis added).

The words in boldface suggest (at least to the examiner and the Board) that "synchronization block 114" results in the embedding of a bit-timing clock signal in the alternating magnetic field generated by Carroll et al.'s reader (controller 10) in the same way that "synchronization block 102" resulted in the embedding of a bit-timing clock signal in the alternating magnetic field generated by Carroll et al.'s

tag (transponder 40). As described in Carroll et al.:

> "Data from the transponder 40 is, as previously described, transmitted at 62.5 KHz **utilizing a phase coherent, Manchester encoded PSK RF signal. The associated controller 10 detects and decodes this signal and data synchronization is determined by the controller 10 when it detects the sync block 102 followed by the start bit 104.** This four bit time synchronization block 102 and start bit 104 comprising a 62.5 KHz modulated carrier is transmitted by the transponder 40 as the first five bits of the configuration word 100." Carroll et al., A853, col. 15, lines 54-63 (emphasis added).

Carroll et al.'s boldface portion above does not explain the mechanics of how sycn block 102 comprising four bit times of a logic level zero signal followed by a single logic level one start bit (Carroll et al., A853, col. 15, lines 14-21) is able to provide a bit-timing clock signal for use in identifying the individual data bits transmitted by the tag (transponder 40). To a person skilled in the art, the answer is obvious. Manchester encoding (see STATEMENT OF FACTS) converts a "0" into a square wave that is negative during the first half of a bit period and positive during the second half. The Communications Handbook, Editor-in-Chief Jerry D. Gibson, CRC Press, Inc. Boca Raton, FL (1987) p. 386-394. A Manchester-encoded sequence of 4 "0's" results in a square wave having a frequency equal to the bit rate. Thus, Carroll et al.'s tag (transponder 40) modulates the phase of the alternating magnetic field with a bit-timing clock signal (i.e. four cycles of a square wave having a frequency equal to the bit rate) and Carroll et al.'s reader (controller 10) demodulates the alternating magnetic field signal, thereby extracting the

embedded bit-timing clock signal which is then used by the reader in identifying the bits transmitted by the tag.

We return now to the command word 112 transmitted by Carroll et al.'s reader (controller 10) to tag (transponder 40) which "incorporates a corresponding synchronization block 114 comprising logic level zero bits D0-D3 followed by a logic level one start bit 116 comprising bit D4 of the command word 112."

Carroll et al.'s reader does not use Manchester encoding in transmitting command word 112. The transmission of a "0" results in the alternating magnetic field of the reader having the unmodulated frequency 125 kHz for the entire bit period. The transmission of a "1" results in the frequency of the alternating magnetic field being 125 kHz for the first half of the bit period and 116.3 kHz for the second half of the bit period:

> "At decision step 348, it is determined whether or not a "one" should be written to the associated transponder 40 in synchronization with the data being transmitted from the transponder 40 to the controller 10. If a "one" bit is to be transmitted to the transponder 40, . . . [t]his is effectuated by toggling the controller 10 carrier from 125 KHz to 116.3 KHz for 1/2 bit time at step 350. If the decision is made that the controller is not writing a "one" at step 348, or has completed the operation of step 350, the firmware proceeds to step 352 signifying the finish of the write operation (FinishWrite"). At this point, the carrier from the controller 10 is returned to the unmodulated 125 KHz for the remainder of the bit time [i.e. the frequency of the alternating magnetic field is 125 KHz for the entire bit period when a "0" is being transmitted (see Fig. 2H, steps 348, 350, and 352)." Carroll et al., A851, col. 11, lines 13-26.

Thus, the transmission of the four "0's" in sync block results in the frequency of the

alternating magnetic field remaining at the unmodulated value of 125 kHz for four bit periods followed by a change to 116.3 kHz for half a bit period when the message start bit "1" (the fifth bit in sync block 114) is transmitted. Sync block 114 provides a message start indication but there is no individual bit timing that is associated with a bit-timing clock signal. In short, there is no bit-timing clock signal embedded in the alternating magnetic field generated by Carroll et al.'s reader and Carroll et al.'s tag has no need for such an embedded bit-timing clock signal to identify the bits transmitted by the reader to the tag since the reader's transmitted data is in bit for bit synchronism with the bits received by the reader from the tag :

> "In operation, in order to read or write data to the non-volatile memory 48 of the transponder 40, the controller sends a command word 112 specifying the appropriate word address 118 and command bits 120 in synchronization with the PSK modulated configuration word transmitted from the transponder 40 to the controller 10. . . . The controller 10 sends the command bits 120 after reading the synchronization block 102 and start bit 104 of the configuration word 100. The sending of the command word 112 bits is **bit-by-bit synchronized with the timing of the bits of the configuration word and any data following by timing from the synchronization block 102** and start bit 104." Carroll et al., A853, col. 16, lines 36-52 (emphasis added).

Note the boldface passage which instructs us that the bit timing is provided by timing from the synchronization block 102 (i.e. the bit-timing clock signal embedded by Carroll et al.'s tag in its alternating magnetic field). The data received from the tag and the data transmitted by the reader are not the equivalents

of bit-timing clock signal. Note in the boldface passage above that the sending of the command word 112 is bit-by-bit synchronized with the timing of the bits of the configuration word and any data following. If the "any data" were a sequence of "0's", there would be no indication whatsoever of bit timing. Thus, it would be fallacious to argue that the data bits transmitted by Carroll et al.'s reader is, or is the equivalent of, a bit-timing clock signal embedded in the reader's alternating magnetic field.

In any event, Carroll et al.'s tag has no need for an embedded bit-timing clock signal in the reader's alternating magnetic field since the reader's data is synchronized with the bit-timing clock signal generated by the tag and embedded in the tag's alternating magnetic field.

The examiner and the Board are unable to point to some action by Carroll et al.'s reader which results in the ***embedding a bit-timing clock signal in the alternating magnetic field*** of Carroll et al.'s reader. Instead, they focus on Carroll et al.'s tag and argue that an embedded bit-timing clock signal arrives in the alternating magnetic field sensed by Carroll et al.'s tag and consequently, the bit-timing clock signal must have been imbedded by the reader.

Specifically, the examiner portrays amplifier 68 in Carroll et al.'s tag (transponder 40) as a device which extracts the bit-timing clock signal embedded in the reader's alternating magnetic field, thereby proving that the reader must have

embedded the bit-timing clock signal in its alternating magnetic field:

> "The output of element 58 [see Carroll et al., Fig. 3] is a bit timing clock signal, the input to element 58 is the signal received from the reader, therefore the [bit-timing] clock signal is inherently embedded in the signal transmitted from the reader." Examiner's Answer, A652.

Element 58 is an amplifier which amplifies the incoming 125-kHz signal from the reader to a level where it can function as a clock signal and drive timing control circuit 60 which provides all of the timing signals used by Carroll et al.'s tag:

> "A logic clock is derived from the induced AC signal [resulting from Carroll et al.'s 125-kHz alternating magnetic field] by means of amplifier 58 and timing control circuit 60. Carroll et al., A852, col. 14, lines 39-40.

Contrary to what the examiner says, the output of element 58 is a 125-kHz clock signal which cannot and does not provide bit-timing information. Although the examiner's claim that "the output of element 58 is a bit timing clock signal" is clearly erroneous, the Board remained convinced by the examiner's logic:

> "We find no error in the Examiner's line of reasoning that concluded that the output of Carroll's element 58 which provides a clock signal input to timing control 60 has embedded therein a bit-timing clock signal as claimed." Decision on Request for Rehearing, A38.

The examiner's (and the Board's) argument seems to be that the signal received from the reader is used as the input clock signal to the tag's timing control circuit 60 which generates a whole family of clock signals Q1, Q2, . . . , Q6, . . . , Q10 (see Carroll et al., A844, Fig. 5; A854, col. 17, lines 41-52). The clock signal Q6 happens to be a square wave with a frequency equal to Carroll et al.'s bit

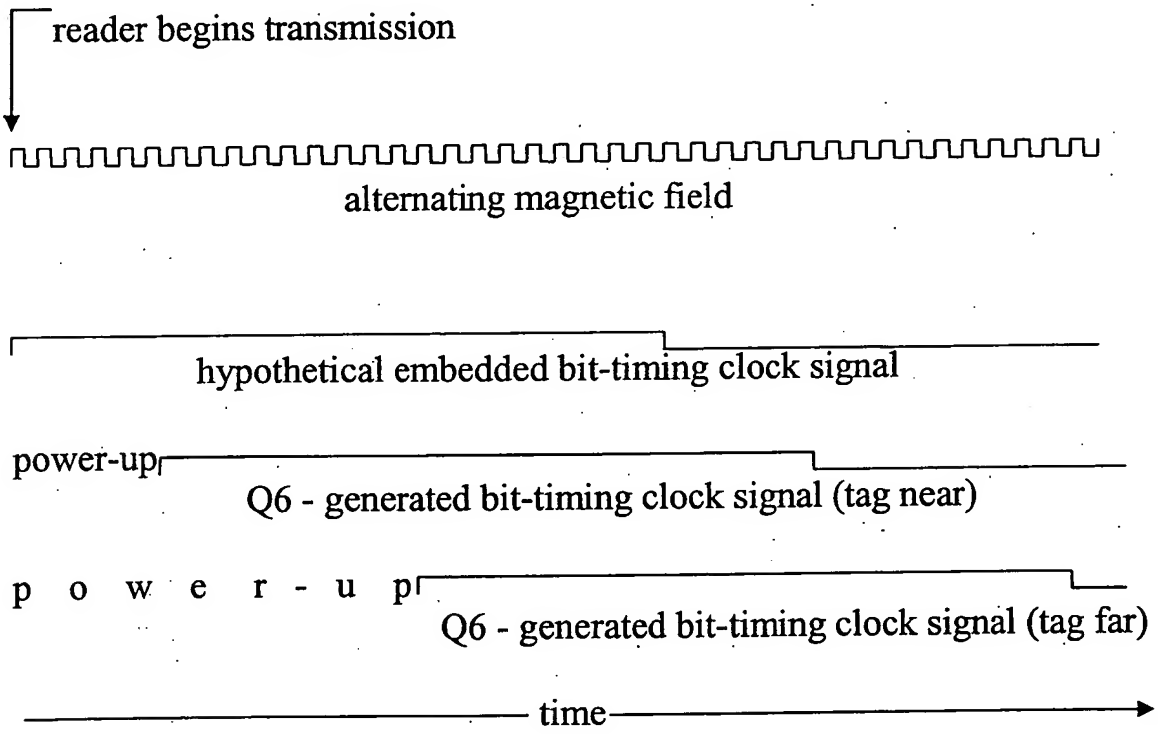
transmission rate, it was generated from a signal received from the reader, and consequently Q6 must have been embedded in the signal received from the reader.

However, Q6 could not possibly be an embedded bit-timing clock signal because its starting time is not fixed with respect to the starting time of the reader's alternating magnetic field, as it would be if it had been embedded in the reader's alternating magnetic field.

Shown below as a function of time is a square-wave representation of Carroll et al.'s alternating magnetic which is shown starting at the left of the page. Let us imagine that a bit-timing clock signal is embedded into the alternating magnetic field by the reader. The alternating magnetic field with the hypothetical embedded bit-timing clock signal would be sensed by Carroll et al.'s tag and if the embedded hypothetical bit-timing clock signal were extracted from the alternating-magnetic-field signal, it would have the same relationship in time with the tag-sensed alternating magnetic field as it did when originally embedded in the alternating magnetic field.

The bit-timing clock signal Q6 generated by timing control circuit 60 by dividing down in frequency the alternating-magnetic-field signal produced by amplifier 58 is different. The power to operate Carroll et al.'s tag is obtained from the reader's alternating magnetic field. Carroll et al., A852, col. 13, lines 8-17. The time required to accumulate enough energy to operate timing control circuit 60

depends on how far the tag is from the reader when the reader's generation of the alternating magnetic field begins. Carroll et al., A852, col. 13, lines 28-46. Thus, power-up for the timing control circuit 60 will occur sooner if the tag is near to the reader and later if the tag is far from the reader (see two versions of Q6 shown below). Thus, it is impossible to know which cycle of the reader's alternating magnetic field will start the generation of Q6.



One can predict exactly the start time of an embedded bit-timing clock signal relative to when the reader starts the generation of the alternating magnetic field. Such is not the case for the start time of the tag-generated bit-timing clock signal Q6. It is this timing unpredictability of Q6 which compels the conclusion

that Q6 is NOT a bit-timing clock signal that was embedded in the reader's alternating magnetic field.

It is difficult to understand how the examiner could conclude that:

> "the output of element 58 is a bit timing clock signal, the input to element 58 is the signal received from the reader, therefore the [bit-timing] clock signal is inherently embedded in the signal transmitted from the reader."

The examiner's concluding remarks regarding an "embedded bit-timing clock signal" are more revealing of his point of view:

> "Assuming that the applicant is correct in stating that the bit timing signal is generated by the transponder 40, and the reader's data to the tag is synchronized with that bit timing signal, then the data from the reader to the tag has embedded data related to the bit timing signal." Examiner's Answer, A653.

This is indeed what appellants have argued. However, the fact that the data from the reader to the tag has embedded <u>data</u> related to the bit timing signal is not a disclosure of a bit-timing signal having been embedded in the reader's alternating magnetic field. Appellants' reader transmits data in accordance with a bit-timing signal which it generates and thus the data from appellants' reader to appellants' tag also "has embedded data related to the bit-timing signal." Nonetheless, the timing information available from the data transmitted by the reader would be too difficult and time-consuming for the tag to determine and appellants found that it was simpler and more efficacious to embed a bit-timing clock signal in the alternating magnetic field for the purpose of identifying the bits in a message.

Where the examiner had said that "the [bit-timing] clock signal is inherently embedded in the signal transmitted from the reader", the Board dropped the "inherently" characterization and boldly stated "that the output of Carroll's element 58 which provides a clock signal input to timing control 60 has embedded therein a bit-timing clock signal as claimed." Referring to the Q6 output of Carroll et al.'s divide-by-64 timing control 60, the Board continued:

> "It is this control signal that Carroll's transponder 40 [tag] transmits to controller 10 [reader], which extracts this bit-timing data and utilizes it to develop a bit-timing signal which is embedded in the data transmitted (Carroll, Figure 4B) from the controller 10 to the transponder 40." Decision on Request for Rehearing, A39.

As discussed above, the Carroll et al. reader (controller 10) does not utilize Manchester line encoding in the transmission of data and the four "0's" in synchronization block 114 (Carroll et al., A843, Fig. 4B) are NOT converted into bit-timing clock signal cycles. Instead, the four "0's" simply result in the alternating magnetic field appearing to be an unmodulated sine wave for the first four bit periods of the command word 112. Thus, a bit-timing clock signal is NOT embedded in the alternating magnetic field created by the reader (controller 10), either before or after bit synchronization is achieved between reader and tag.

Since Carroll et al. does not disclose at least one limitation of claim 70, Carroll et al. did not anticipate claim 70.

* * * * *

As a result of a Federal Circuit decision, examiners are required to interpret a step-plus-function limitation in a claim in terms of the corresponding structure, materials or acts described in the specification:

> "As a consequence of a decision by the Court of Appeals for the Federal Circuit in its en banc decision *In re Donaldson Co.*, 16 F.3d 1189, 29 USPQ2d 1845 (Fed. Cir. 1994), "examiners must interpret a 35 U.S.C. 112, sixth paragraph 'means or step plus function' limitation in a claim as limited to the corresponding structure, materials or acts described in the specification and equivalents thereof. . . ." MPEP § 2181.

The limitation "embedding a bit-timing clock signal in the alternating magnetic field" should be considered to be a step-plus-function element since "the element at issue sets forth a step for reaching a particular result, but not the specific technique or procedure used to achieve the result." *Caterpillar Inc. v. Detroit Diesel Corp.*, 41 USPQ2d 1876, 1882 (N.D. Ind. 1996) (cited in MPEP § 2181). Thus, this limitation is subject to the requirements of *In re Donaldson Co.*

The "embedding a bit-timing clock signal" step is accomplished by the circuitry shown in appellants' Fig. 8, as described in paragraph 0082 of appellants' specification, by microprocessor 17 transmitting an alternating sequence of "0's" and "1's", the bit-timing clock signal, upon the receipt of the "send message" command initiated by the user of the apparatus. Specification, A63, ¶ 0081.

The acts and circuitry of Carroll et al., as described in A853, col. 16, lines 1-10, 36-41, are quite different. Carroll et al.'s "controller 10" transmits data in bit-

for-bit synchronization with the data received from "transponder 40". "Controller 10" repeats "sync block 102" (Carroll et al., A843, Figs. 4A and 4B) but since it consists of 4 "0's" (no "0"-to-"1" transitions), it provides no useful bit-timing information to the transponder, and such information is not required by the transponder in any event since the data transmitted by "controller 10" is bit-synchronized to the data transmitted by "transponder 40" to the controller.

An *In re Donaldson Co.* analysis comes to the same conclusion as a straightforward analysis of the words of the claim. Carroll et al. does not disclose the "embedding a bit-timing clock signal in the alternating magnetic field" limitation of claim 70 and did not anticipate claim 70.

The Board cites the concurring opinion of Judge Rader in *Seal-Flex Inc. v. Athletic Track and Court Construction*, 172 F.3d 836, 50 U.S.P.Q.2d 1225 (Fed. Cir. 1999) in concluding that the elements of claims 70, 71, and 75 are not step-plus-function elements and therefore do not invoke 35 U.S.C. § 112, ¶ 6.

Appellants are of the opinion that the Board misreads Judge Rader's opinion and that the aforementioned claim elements are step-plus-function elements and therefore do invoke 35 U.S.C. § 112, ¶ 6.

The Board cites the following paragraph from Judge Rader's decision as being particularly significant.

> "In general terms, the 'underlying function' of a method claim element corresponds to what that element ultimately accomplishes in relationship to

> what the other elements of the claim and the claim as a whole accomplish. 'Acts,' on the other hand, correspond to how the function is accomplished. Therefore, claim interpretation focuses on what the claim limitation accomplishes, i.e., it's underlying function, in relation to what is accomplished by the other limitations and the claim as a whole. If a claim element recites only an underlying function without acts for performing it, then § 112, ¶ 6 applies even without express step-plus-function language." Id. F.3d at 849, USPQ2d at 1234.

The Board applied this passage to the problem at hand by stating:

> "[I]t is our view that the underlying function set forth in claims 70 and 71, and what is accomplished by the claim as a whole, is the interrogation of a tag." Decision on Appeal, A17.

Even though Judge Rader states that:

> "In general terms, the 'underlying function' of a method claim **element** [emphasis added] corresponds to what that element ultimately accomplishes" and "claim interpretation focuses on what the claim **limitation** [emphasis added] accomplishes, i.e., it's underlying function, in relation to what is accomplished by the other limitations and the claim as a whole",

the Board somehow concludes that Judge Rader's "underlying function" has to do with the claim as a whole rather than with each limitation of the claim.

It would seem that a careful reading of the paragraph quoted by the Board from Judge Rader's Opinion would be sufficient in itself to convince the Board of its error. In case it did not, we offered additional material from Judge Rader's opinion which elaborates on Judge Rader's statement that "the 'underlying function' of a method claim element corresponds to what that element ultimately accomplishes."

In his analysis of claim 1 of the patent at issue in *Seal-Flex*, Judge Rader states:

> "Although claim 1 recites several 'steps' 'for constructing an activity mat over a foundation', the recitation of the overall function of the claim in the preamble does not suffice to convert each element into an act for performing that function so as to preclude application of § 112, ¶ 6." Id. F.3d at 849-50, USPQ2d at 1234-35.

And yet this approach, proscribed by Judge Rader, is the one taken by the Board when it concludes that each step recited in claims 70, 71, and 75 are merely acts for performing the underlying function of the claim—the interrogation of a tag.

Judge Rader further illustrates his point in his discussion of claim 1 of the patent at issue in the *Seal-Flex* case which recites:

> "A method for constructing an activity mat over a foundation comprising the steps of . . . spreading an adhesive tack coating for adhering the mat to the foundation over the foundation surface."

Judge Rader points out that "spreading an adhesive tack coating" is an "act" introduced by the words "comprising the steps of" and "adhering the mat to the foundation over the foundation surface" is the function—the result achieved by performing the claimed act of "spreading." Judge Rader observes that this limitation does not invoke § 112, ¶ 6 because it recites more than a function, "namely the claimed act of spreading". Id. F.3d at 849-50, USPQ2d at 1234-35..

Judge Rader goes on to say that "if the limitation had claimed 'a step for adhering the mat to the foundation' without the additional recitation of an act or

acts for 'adhering', then § 112, ¶ 6 would have governed its interpretation. Likewise, if this claim limitation had specified only the underlying function, namely, 'adhering the mat to the foundation', without recital of specific acts for 'adhering', § 112, ¶ 6 would have governed, despite the lack of 'step for' language. Id. F.3d at 849-50, USPQ2d at 1234-35.

Note how the limitations of appellants' claims 70, 71, and 75 are all in the format of "adhering the mat to the foundation" and in the view of Judge Rader, would invoke § 112, ¶ 6.

The Board erred in refusing to invoke § 112, ¶ 6 in its analysis of the patentability of claims 70, 71, and 75.

CLAIM 71

Claim 71 reads as follows:

71. A method for interrogating a tag, ***[1] the tag responding to an interrogation by transmitting a sequence of bits, the start of each bit being determined by a bit-timing clock signal generated by the tag and synchronized with a bit-timing clock signal originating with the interrogator,*** *the method comprising the steps:*

[2] generating a bit-timing clock signal;

[3] generating an alternating magnetic field in which the bit-timing clock signal

is embedded;

[4] extracting data transmitted by the tag utilizing the bit-timing clock signal.

Carroll et al. does not disclose any of the four limitations shown in boldface.

Limitation [1]

Carroll et al.'s tag (transponder 40) responds to an interrogation (the appearance of an unmodulated alternating magnetic field) by transmitting a sequence of bits in accordance with a bit-timing clock signal generated by the tag, but this bit-timing clock signal is NOT synchronized with a bit-timing clock signal originating with the reader (controller 10) since the reader does NOT transmit a bit-timing clock signal to the tag.

Carroll et al.'s bit-timing clock signal Q6 in the tag (transponder 40) is obtained by dividing down the frequency of the interrogating signal. Carroll et al., A851-A852, col. 12, line 20 - col. 13, line 7. As discussed above under the **CLAIM 70** heading, the reader (controller 10) does not transmit a bit-timing clock signal to the tag, and the tag does not require one.

The examiner argues that "The sync signal that is generated in element 70 of Carroll is a bit timing clock signal." Examiner's Answer, A653. Element 70 is a "Manchester Encoder and Sync Generator" located in Carroll et al.'s transponder

40 and reinforces appellants' position that bit-timing for data transmission in Carroll et al.'s invention originates in the tag (transponder 40).

The examiner argues that limitation [1] appears in the preamble of the claim and merely recites the purpose of a process. Examiner's Answer, A653. However, The Manual of Patent Examining Procedure emphasizes:

> "Any terminology in the preamble that limits the structure of the claimed invention must be treated as a claim limitation. See, e.g. *Corning Glass Works v. Sumitomo Elec. U.S.A., Inc.*, 868 F.2d 1251, 1257, 9 USPQ2d 1962, 1966 (Fed. Cir. 1989)." MPEP § 2111.02.

In the case of a method claim, it would be appropriate to substitute "steps" for "structure". For example, "a method for getting from one place to another" is merely a statement of the purpose of the method and does not imply any limitations on the method steps. On the other hand, "a method for communicating using the Verizon Wireless network" is not merely a statement of use but also implies certain limitations on the method steps if the method steps are to be compatible with the Verizon Wireless network.

In the present case of a method for interrogating a tag which responds "to an interrogation by transmitting a sequence of bits, the start of each bit being determined by a bit-timing clock signal generated by the tag and synchronized with a bit-timing clock signal originating with the interrogator", the "for use" clause, like the cell phone example, is not merely a statement of use but also implies limitations on the method steps if the method steps are to be compatible with tags

having the specified characteristics.

Consider, for example, the consequences of omitting "and synchronized with a bit-timing clock signal originating with the interrogator." Such an omission would have a profound effect on the scope of limitation [4] since extracting data transmitted by the tag would be significantly more complicated if the bit-timing clock signals of interrogator and tag were not synchronized.

This example demonstrates that limitation [1] affects the scope of at least one of the other limitations and must be taken into account in determining the patentability of the claim.

One might ask whether a method for interrogating a tag which responds "to an interrogation by transmitting a sequence of bits, the start of each bit being determined by a bit-timing clock signal generated by the tag and synchronized with a bit-timing clock signal originating with the interrogator" asserts step limitations that are not already fully and intrinsically set forth by the limitations in the body of the claim:

> "If the body of a claim fully and intrinsically sets forth all of the limitations of the claimed invention, and the preamble merely states, for example, the purpose or intended use of the invention, rather than any distinct definition of any of the claimed invention's limitations, then the preamble is not considered a limitation and is of no significance to claim construction. *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305, 51 USPQ2d 1161, 1165 (Fed. Cir. 1999). MPEP § 2111.02.

None of the body elements of the claims at issue disclose either separately or in

combination limitation [1] and thus, this limitation represents an additional limitation which must be treated as a legitimate claim limitation and not merely "a statement of purpose or use."

The Board agreed with the examiner that the language of claim 71 does not require that limitations in the preamble be given patentable weight. The reason given by the Board for not considering the preamble as a claim limitation is that:

> "There is no clear indication or requirement that such a bit-timing clock signal [i.e. the one referred to in the main body of the claim and originating with the interrogator] corresponds to the bit-timing clock signal referenced in the preamble. In other words, the preamble of claim 71 which sets forth a specific manner in which an interrogated tag responds to an interrogation, is a mere intended use of the claimed method of interrogating a tag set forth in the body of the claim." Decision on Appeal, A14.

The Board was mistaken. The "clear indication" is provided in the preamble by referring to the bit-timing clock signal to which the tag-generated bit-timing signal is synchronized as "a bit-timing clock signal originating with the interrogator."

The above argument was made to the Board in appellants' Request for Rehearing and the Board responded by repeating its original argument.

The preamble includes information regarding the timing of the bits in the response from a tag and thus places limitations on the acts required to perform the "extracting data" limitation. For this reason, the preamble cannot be ignored in determining the patentability of claim 71.

Limitation [2]

Carroll et al.'s reader (controller 10) does NOT generate a bit-timing clock signal and consequently, limitation [2] is not disclosed by Carroll et al. Please see **STATEMENT OF FACTS** for information as to how Carroll et al.'s reader and tag achieve synchronization without the reader having to generate a bit-timing clock signal.

The examiner argues that "[t]he sync signal that is generated in element 70 of Carroll is a bit timing clock signal." Examiner's Answer, A653. The sync signal referred to by the examiner has to do with acts performed in Carroll et al.'s tag (transponder 40). Limitation [2] refers to an act performed by the "interrogator", the counterpart of Carroll et al.'s reader (controller 10). Carroll et al.'s reader does not generate a bit-timing clock signal.

The Board responded to appellants' arguments as follows:

> "[T]he claimed clock signal generating feature is met by the encoder (70) in the transponder of Carroll since the body of the claim does not require that the clock signal generation originate at the reader." Decision on Appeal, A14.

In its Request for Rehearing appellants' argued as follows.

But if the bit-timing clock signal is generated by the tag, how does the interrogating apparatus perform the step of "generating an alternating magnetic field in which the bit-timing signal is embedded" when a communication link from

the tag to the interrogating apparatus has not yet been established? (Please see **STATEMENT OF FACTS** for the sequence of steps that Carroll et al.'s reader and tag must execute to achieve synchronization.)

The Board did not respond in any substantive way to appellants' arguments. Decision on Request for Rehearing, A39-A40.

Limitation [3]

Carroll et al.'s reader (controller 10) does not embed a bit-timing clock signal in the reader's alternating magnetic field. Please see discussion under the **CLAIM 70** heading.

The examiner argues that "[t]he sync signal that is generated in element 70 of Carroll is a bit timing clock signal and is transmitted through the PSK modulator." Examiner's Answer, A653-A654.

The sync signal referred to by the examiner has to do with acts performed in Carroll et al.'s tag (transponder 40). Limitation [3] refers to an act performed by the "interrogator", the counterpart of Carroll et al.'s reader (controller 10). Carroll et al.'s reader does not generate an alternating magnetic field in which the bit-timing clock signal is embedded.

The Board did not respond to the above arguments.

Limitation [4]

Carroll et al.'s reader (controller 10) does not extract the data carried by the

signal transmitted by Carroll et al.'s tag (transponder 40) using a bit-timing signal originating in Carroll et al.'s reader. Carroll et al.'s reader does not generate such a signal (see discussion above under ***Limitation [2]*** heading) and obviously cannot use it in extracting the data sent by transponder 40.

The examiner seemed to agree with appellants in stating that:

> "the interrogator receiving the response from the tag uses the bit timing clock signal generated by [tag] element 70 in order to properly receive and decode the response." Examiner's Answer, A654.

The Board, though agreeing with the examiner in his purported argument that limitation [4] had been disclosed by Carroll et al., also seemed to agree with appellants:

> "It is apparent, however, from our reading of Carroll that, in the ongoing communication between the controller (interrogator) and the transponder (tag), the controller is responding to bit-timing control signals generated at the transponder by utilizing such signal information and embedding it in the signals transmitted back to the transponder (Carroll, [A843] Figure 4B)." Decision on Request for Rehearing, A39-A40.

If "the controller is responding to bit-timing control signals generated at the transponder", does this not mean that the controller is NOT extracting data transmitted by the tag utilizing the bit-timing clock signal generated by the controller? Indeed it does, as Carroll et al. make clear:

> "The associated controller 10 detects and decodes this signal and data synchronization is determined by the controller 10 when it detects the sync block 102 followed by the start bit 104 [supplied by transponder 40]." Carroll et al., A853, col. 15, lines 56-59.

Clearly, controller 10 does NOT detect and decode the signal received from transponder 40 utilizing a bit-timing clock signal generated by controller 40 as limitation [4] specifies. Instead, controller 10 utilizes the bit-timing clock signal generated and transmitted by transponder 40 to the reader.

Carroll et al. does not disclose limitation [4].

Carroll et al. does not describe each and every element of claim 71 and therefore did not anticipate appellants' claim-71 invention.

* * * * *

As a result of the *In re Donaldson Co.* decision, examiners are required to interpret means-plus-function and step-plus-function limitations in a claim in terms of the corresponding structure, materials or acts described in the specification. Limitation [1] should be considered to be a means-plus-function claim since it recites a function to be performed and does not recite sufficient structure to preclude application of 35 U.S.C. § 112, sixth paragraph. Limitations [2], [3], and [4] should be considered to be step-plus-function elements since "the element at issue sets forth a step for reaching a particular result, but not the specific technique or procedure used to achieve the result." *Caterpillar Inc. v. Detroit Diesel Corp.*, 41 USPQ2d 1876, 1882 (N.D. Ind. 1996) (cited in MPEP § 2181). Thus, all of the boldface limitations are subject to the requirements of *In re Donaldson Co.*

With respect to limitation [1], paragraphs 0111 through 0119 of the specification (A69-A71), with reference to Fig. 18 (A102-A103), describe how a bit-timing clock signal generated by the tag is synchronized with a bit-timing clock signal originating with the interrogator. The bit-timing clock signal is generated by frequency divider 255 and frequency divider 281 which divides down the frequency of the received signal.

Carroll et al. uses timing control 60 in Fig. 5 (A844) to generate a bit-timing signal. But there is nothing in Carroll et al.'s Fig. 5 that corresponds to appellants' Fig. 18 circuitry that extracts an embedded bit-timing clock signal from the interrogating magnetic field and then synchronizes the generated bit-timing clock signal with the extracted bit-timing clock signal.

With respect to Limitations [2] and [3], the bit-timing clock signal is generated in appellants' reader by VCO/CGC 13. Specification, A58, ¶ 0051. The bit-timing clock signal is embedded in the alternating magnetic field by the circuitry shown in appellants' Fig. 8 (A98), as described in paragraph 0082 (A63-A64) of appellants' specification, by microprocessor 17 transmitting an alternating sequence of "0's" and "1's" upon the receipt of the "send message" command initiated by the user of the apparatus. Specification, A63, ¶ 0081.

With respect to Limitation [4], the extraction of data transmitted by the tag utilizing the bit-timing clock signal is performed by microprocessor 17 with inputs

supplied by the circuitry shown in Figs. 6 (A96) and 7 (A97) and in accordance with the processes outlined in Figs. 19 (A104) and 20 (A105). Specification, A58-A60, ¶¶ 56-60; A61, ¶ 67.

Carroll et al. describes in detail the operations performed by microcomputer 12 beginning at col. 7, line 5 (A849), but does NOT disclose the generation of a bit-timing clock signal. Carroll et al. describes the generation of an "RF magnetic field" by microprocessor 12 (A849, col. 7, lines 5-10), but Carroll et al. does NOT disclose embedding a bit-timing clock signal in the RF magnetic field. Carroll et al. describes how the "start" bit of transponder 40's message is identified (A850, col. 10, lines 53-61), but Carroll et al. does NOT disclose extracting data transmitted by transponder 40 utilizing a bit-timing clock signal.

An *In re Donaldson Co.* analysis comes to the same conclusion as a straightforward analysis of the words of claim 71. Carroll et al. does not disclose any of limitations [1]-[4] and did not anticipate claim 71.

CLAIM 75

Claim 75 reads as follows:

75. A method for responding to the establishment of an alternating magnetic field by a reader, ***[1] a bit-timing signal being embedded in the alternating magnetic field by the reader,*** *the method comprising the steps:*

deriving a signal from the alternating magnetic field;

[2] generating a bit-timing clock signal that is synchronized to the bit-timing clock signal embedded by the reader in the alternating magnetic field;

generating an alternating magnetic field;

[3] modulating the alternating field generated by the responder with a sequence of bits to be communicated to a reader, the start of each transmitted bit being governed by the bit-timing clock signal.

Carroll et al. does not disclose any of the limitations shown in boldface.

Limitation [1]

This limitation is the same as the boldface limitation of claim 70. Please see the argument presented above under the **CLAIM 70** heading in support of the assertion that Carroll et al. does not disclose Carroll et al.'s reader "embedding a bit-timing clock signal in the alternating magnetic field".

The examiner states that this limitation, since it appears in the preamble of the claim, was not "given patentable weight." Examiner's Answer, A656. However:

> "If the claim preamble, when read in the context of the entire claim, recites limitations of the claim, or, if the claim preamble is 'necessary to give life, meaning, and vitality' to the claim, then the claim preamble should be construed as if in the balance of the claim." *Pitney Bowes, Inc. v. Hewlett-*

Packard Co., 182 F.3d 1298, 1305, 51 USPQ2D 1161, 1165-66 (Fed. Cir. 1999).

Certainly, the preamble in the present case is necessary to give meaning to the body limitations of the claim and "should be construed as if in the balance of the claim."

The Board seemed to accept the legitimacy of this preamble limitation and seemed to construe the claim as if it were in the body of the claim. The Board said:

> "Appellants reiterate their contention that Carroll does not disclose the embedding of a bit-timing clock signal in the alternating magnetic field generated at the reader. For all of the reasons discussed previously, we find such argument to be unpersuasive since there is no claimed requirement that the bit-timing clock signal originate at the reader." Decision on Appeal, A15.

Appellants have never made the argument alleged by the Board. What appellants' have argued and continue to argue is that Carroll et al. does not disclose is "a bit-timing clock signal being embedded in the alternating magnetic field by the reader."

Limitation [2]

Carroll et al. does not disclose Carroll et al.'s tag (transponder 40) "generating a bit-timing clock signal that is synchronized to the bit-timing clock signal embedded by the reader in the alternating magnetic field". There is no bit-timing clock signal embedded in the alternating magnetic field created by Carroll

et al.'s reader (controller 10) (see discussion under the **CLAIM 70** heading), and consequently, there is no way for Carroll et al.'s tag (transponder 40) to generate a bit-timing clock signal "that is synchronized to the bit-timing clock signal embedded by the reader in the alternating magnetic field".

The Board had nothing to say concerning this limitation.

The primary basis for the Board's sustaining the rejection of claims 70, 71, and 75 is a belief that a bit-timing clock signal is embedded in the alternating magnetic field generated by Carroll et al.'s reader (controller 10). Decision on Appeal, A13. Please see **STATEMENT OF FACTS** for information as to how Carroll et al.'s reader and tag actually achieve synchronization, WITHOUT a bit-timing clock signal being embedded in the alternating magnetic field generated by Carroll et al.'s reader.

Limitation [3]

Carroll et al. does not disclose a tag (transponder 40) modulating the alternating field generated by the tag with a sequence of bits to be communicated to a reader (controller 10) whereby the start of each transmitted bit is governed by a bit-timing clock signal that is synchronized to a bit-timing clock signal embedded by the reader in the alternating magnetic field generated by the reader. A bit-timing clock signal that is synchronized to a bit-timing clock signal embedded by the reader in the reader's alternating magnetic field is simply not available in the

tag (see Limitations [1] and [2]).

Please see **STATEMENT OF FACTS** for information as to how Carroll et al.'s reader and tag actually achieve synchronization, WITHOUT a bit-timing clock signal being embedded in the alternating magnetic field generated by Carroll et al.'s reader.

* * * * *

As a result of the *In re Donaldson Co.* decision, examiners are required to interpret a step-plus-function limitation in a claim in terms of the corresponding structure, materials or acts described in the specification.

With respect to an *In re Donaldson Co.* analysis of limitation [1], please see discussion under the **CLAIM 70** heading.

With respect to limitations [2] and [3], these limitations should be considered to be a step-plus-function elements since "the element at issue sets forth a step for reaching a particular result, but not the specific technique or procedure used to achieve the result." *Caterpillar Inc. v. Detroit Diesel Corp.*, 41 USPQ2d 1876, 1882 (N.D. Ind. 1996) (cited in MPEP § 2181). Thus, these limitations are subject to the requirements of *In re Donaldson Co.*

Limitation [2] is accomplished by appellants' frequency divider 255 and frequency divider 281 as shown in Fig. 18 (A102-A103) and described in the

Specification, A70, ¶ 0117. The embedded bit-timing clock signal is extracted from the received interrogating signal by amplitude demodulator 251 and used to synchronize the generated bit-timing signal as described in the Specification, A70, ¶ 0118. There is nothing in Carroll et al. that corresponds to appellants' synchronization circuitry as shown in appellants Fig. 18 (A102-A103) and described in A70, paragraph 0118, of the Specification.

Limitation [3] is accomplished by appellants' microprocessor 61 (A94, Fig. 1) utilizing data stored in the microprocessor and supplied to resonance-tracking modem 57 in accordance with the bit rate clock signal generated by frequency divider 281 (A102, Fig. 18(A)). The microprocessor may be programmed to use either phase shift keying, frequency shift keying, or a combination of the two. A71, ¶¶ 124-125.

An *In re Donaldson Co.* analysis comes to the same conclusion as a straightforward analysis of the words of the claim. Carroll et al. does not disclose appellants' circuitry for "modulating the alternating field generated by the responder with a sequence of bits to be communicated to a reader, the start of each transmitted bit being governed by the bit-timing clock signal, or equivalents thereof, and consequently did not anticipate Limitation [3] of appellants' claim-75 invention.

II. Whether claims 47, 56, and 57 are unpatentable under 35 U.S.C. § 103(a) in view of Carroll et al. (U.S. Pat. No. 5,517,194).

CLAIM 47

Claim 47 reads as follows:

47. A tag for use with a reader, the reader communicating a sequence of bits to the tag by transmitting a first signal during a bit period when a "0" bit is to be communicated and a second signal during a bit period when a "1" is to be communicated, ***[1] the reader embedding a bit-timing clock signal in the transmitted signals****, the tag comprising:*

a coil;

a capacitor;

a means for coupling the capacitor to the coil and coupling the coil to at least one other means, the signal(s) provided to the other means as a result of the coupling being called coupling-means signal(s), the combination of the coil, the capacitor, and the coupling means being called the resonating circuit;

[2] a means for generating a bit-timing clock signal that is synchronized to the bit-timing clock signal embedded in the transmitted signals;

[3] a means for identifying the bit being transmitted during each bit period, the beginning and ending of each bit period being indicated by the bit-timing clock signal.

Carroll et al. does not disclose any of the limitations in boldface.

Limitation [1]

Limitation [1] is not disclosed by Carroll et al. For details, please see discussion under the **ISSUE I, CLAIM 70** heading. For the justification of giving patentable weight to this preamble limitation, please see discussion under the heading **ISSUE I, CLAIM 75, *Limitation [1].***

The examiner expanded somewhat in his Answer to Appellants' Brief as to how Carroll et al.'s reader (controller 10) allegedly embeds a bit-timing clock signal in the transmitted signals:

> "Carroll does embed bit timing information in the driving signal in that the signal from the reader includes periodic bits, their start/end points "embed" the bit timing signal into the driving signal." Examiner's Answer, A662.

The "bit timing information" contained within the transmission of a sequence of data bits is not the same as a "bit-timing clock signal", the term that is used in appellants' claims. Persons skilled in the art understand a 'clock signal' as being a periodic signal whose high-to-low or low-to-high transitions can be used to trigger actions of one sort or another. A "bit-timing clock signal" is a clock signal used to time the transmission or reception of a sequence of bits and consequently is a periodic signal having a frequency equal to the bit rate (or half the bit rate if either a low-to-high or a high-to-low transition marks the start of a bit). Carroll et al.

utilizes a bit-timing clock signal Q6 in transponder 40 to time the transmission of bits to controller 10. Carroll et al., A855, col. 20, lines 33-42.

Both appellants' and Carroll et al. utilize embedded bit-timing signals (as defined above) in achieving reader-tag bit synchronization. Appellants' embed the bit-timing clock signal in the reader-created alternating magnetic field while Carroll et al. embed the bit-timing clock signal in the tag-created magnetic field. Neither appellants nor Carroll et al. considered the transmission of data bits by themselves as a substitute for the transmission of a bit-timing clock signal.

Carroll et al. does not disclose limitation [1].

Limitation [2]

Carroll et al.'s reader (controller 10) does not transmit a bit-timing clock signal to Carroll et al.'s tag (transponder 40) (see **STATEMENT OF FACTS** and discussion under **ISSUE I, CLAIM 70** heading). Consequently, there is no bit-timing clock signal originating in controller 10 that could be used by transponder 40 to synchronize its own bit-timing clock.

See **ISSUE I, CLAIM 75, *Limitation [2]*** for additional discussion of this limitation.

Carroll et al. does not disclose limitation [2].

Limitation [3]

Carroll et al.'s tag (transponder 40) has no information available from

Carroll et al.'s reader (controller 10) as to the beginning and ending of a bit period and therefore does not teach the use of this information in identifying the bit being transmitted during the bit period.

Carroll et al. does not disclose Limitation [3].

Carroll et al. does not teach the boldface limitations of claim 47, and there is no motivation for incorporating the limitations in Carroll et al.'s controller 10 and transponder 40.

Prima facie obviousness of claim 47 has not been established.

The examiner's basic argument with respect to claim 47, notwithstanding the factual disclosures of Carroll et al., is that Carroll et al.'s reader embeds a bit-timing clock signal in the reader's alternating magnetic field, and that all of the limitations of claim 47 necessarily follow. Examiner's Answer, A661-A662.

The Board responded to appellants' arguments rebutting the examiner's assertions with respect to claim 47 by reiterating the examiner's arguments and stating their agreement with them. Decision on Appeal, A26. Additional arguments by appellants in their Request for Rehearing produced no change in the Board's position. Decision on Request for Rehearing, A41-A42.

CLAIM 56

Claim 56 reads as follows:

56. A tag for use with a reader, ***[1] the reader transmitting a bit-timing clock signal to the tag,*** *the tag comprising:*

a coil;

a capacitor;

a means for coupling the capacitor to the coil;

a means for driving the coil with a driving signal;

a means for generating the driving signal;

[2] a means for generating a bit-timing clock signal synchronized to the reader bit-timing clock signal;

[3] a means for embedding a sequence of bits to be communicated to a reader in the driving signal, the start of each bit being controlled by the bit-timing clock signal.

Carroll et al. does not teach the limitations of claim 56 shown in boldface, and there is no motivation for incorporating these limitations in Carroll et al.'s transponder 40.

Limitation [1]

Limitation [1] is not disclosed by Carroll et al. For details, please see discussion under the **CLAIM 47,** ***Limitation [1]*** heading.

Limitation [2]

Carroll et al.'s reader (controller 10) does not transmit a bit-timing clock signal to Carroll et al.'s tag (transponder 40) (see discussion under **ISSUE I, CLAIM 70** heading). Consequently, there is no bit-timing clock signal originating in controller 10 that could be used by transponder 40 to synchronize its own bit-timing clock. For additional discussion of this limitation, see **ISSUE I, CLAIM 75, *Limitation [2].***

Carroll et al. does not teach Limitation [2].

Limitation [3]

Since the bit-timing clock signal specified by limitation [2] does not exist in Carroll et al.'s transponder 40, Carroll et al. obviously cannot disclose limitation [3] which requires this non-existent bit-timing clock signal.

Carroll et al. does not teach the boldface limitations of claim 56, and there is no motivation for incorporating these limitations in Carroll et al.'s transponder 40.

Prima facie obviousness of claim 56 has not been established.

The examiner argues with respect to all of the limitations of claim 56 that "Carroll is not cited for teaching each and every element as claimed" (08/12/03 Office Action, A230) and yet he cites no other references. The examiner argues

that "applicant failed to appreciate the teachings of Carroll" (08/12/03 Office Action, A230). But pointing out that Carroll et al. does not disclose specified limitations in claims does not mean that applicants "failed to appreciate the teachings of Carroll." Finally, the examiner argues that "applicant ignored the application of Carroll as discussed in the OBVIOUSNESS rejection set forth in the Office Action" (08/12/03 Office Action, A230) but applicants are unable to find any discussion whatsoever of claim 56 and its limitations in the "obviousness" portion of the office action relating to Carroll et al. See 08/12/03 Office Action, A213-A214.

The Board found appellants' arguments to be unpersuasive and reiterated their approval of the examiner's line of reasoning.

CLAIM 57

Claim 57 reads as follows:

57. The tag of claim 56 wherein the means for embedding a sequence of bits comprises:

a means for causing the phase of the driving signal to have a first phase when a "0" bit is being transmitted and to have a second phase when a "1" bit is being transmitted.

The boldface limitation is not disclosed by Carroll et al.

Carroll et al. teaches the use of Manchester-coded PSK in transmitting data from the tag (transponder 40) to the reader (controller 10). Carroll et al., A855, col. 20, lines 33-35. Manchester-coded PSK results in the driving signal having (1) a first phase during the first half of a bit period and a second phase during the second half of a bit period when a "0" is transmitted and (2) the second phase during the first half of a bit period and the first phase during the second half of a bit period when a "1" is transmitted. Manchester-coded PSK is not a teaching of appellants' claim-57 limitation.

Manchester-coded PSK has some very desirable properties, and a person skilled in the art would not be motivated by knowledge generally available to one of ordinary skill in the art to change Carroll et al.'s modulation technique to the one specified in appellants' claim 57. The examiner has not suggested any motivation for a person skilled in the art to make such a change.

Carroll et al. does not teach the claim-57 limitation, and there is no motivation for changing Carroll et al.'s preferred modulation technique to the one specified in claim 57.

Prima facie obviousness of claim 57 has not been established.

The examiner argues that the claim language does not require "the phase be constant for the entire bit period.". Examiner's Answer, A663.

The examiner is incorrect. The claim language does require the phase of the

driving signal to be a constant during the entire bit period and to be equal to a "first phase" when a "0" bit is being transmitted and to be equal to a "second phase" when a "1" bit is being transmitted. This interpretation of "phase" is consistent with the definition "an additive constant in the argument of a trigonometric function." McGraw-Hill Dictionary of Scientific and Technical Terms, Fourth Edition, McGraw-Hill, Inc., New York, N.Y. (1989).

Appellants suggested to the examiner that he was interpreting the claim limitation as if it read as follows: "a means for causing the phase of the driving signal to have a first phase FOR AT LEAST A PORTION OF THE TIME when a "0" bit is being transmitted." But the words "FOR AT LEAST A PORTION OF THE TIME" do not appear in the claim.

The examiner responded as follows:

> "The claim require [*sic*] a first phase for a '0' and a second phase for a '1' but does not require that the phase be constant for the entire bit period. Here again the applicant is attempting to further limit the claims by unfairly 'interpreting' limitations into the claims, which simply are not present. The applicant argues that the examiner's interpretation of the claim is incorrect because 'for at least a portion of the time' does not exist in the claim. The claims do not preclude such an interpretation by including a limitation such as 'for the entire bit period' and since the claim is construed in the open language 'comprising', it is well held that the claimed limitation need only exist once in the prior art to be taught by the references. Examiner's Answer, A663.

The ordinary meaning of the claim is that the phase of the driving signal has a first phase WHEN A "0" IS BEING TRANSMITTED and a second phase WHEN A

"1" IS BEING TRANSMITTED, and this ordinary meaning should be what counts during examination. *In re Zletz*, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989). The examiner may not import into the claim a limitation not present in the claim (such as "for at least a portion of the time").

"Comprising" is a term of art used in claim language which means that the named elements are essential, but other elements may be added and still form a construct within the scope of the claim. *Genentech, Inc. v. Chiron Corp.*, 112 F.3d 495, 501, 42 USPQ2d 1608, 1613 (Fed. Cir. 1997). The use of "comprising" does not give license to the examiner to add additional limitations to a particular claim element.

The transmission of a bit is accomplished by transmitting a particular signal during a period of time called the bit period. Typically, the duration of the particular signal equals the bit period but it can be less. The transmission of a bit begins with the start of the particular signal and ends with the end of the particular signal. The bit is "being transmitted" for the duration of the particular signal that represents the bit, the signal duration typically being the same as the bit period. There is no other reasonable interpretation.

The examiner's interpretation of claim 57 is not only contrary to the straightforward grammatical interpretation of the language, but unreasonable. The examiner's assertion that claim 57 "requires a first phase for a '0' and a second

phase for a '1' but does not require that the phase be constant for the entire bit period" would have the effect of claim 57 having no meaning whatsoever. Every driving signal has a phase and consequently every driving signal would fall within the bounds of claim 57 (as interpreted by the examiner), regardless of how the phase of the driving signal varied during the bit period.

Carroll et al. does not disclose the limitation of claim 57. Even if Carroll et al. had disclosed the limitation, the examiner has not presented any arguments as to why a person skilled in the art would be motivated to incorporate the claim-57 means for communicating data from a tag to a reader into the Carroll et al. invention.

Claim 57 is not obvious in view of Carroll et al.

CONCLUSIONS

The only prior art cited by the examiner in rejecting Claims 70. 71, 75, 47, 56, and 57 is Carroll et al. (U.S. Patent 5,517,194) and there is no disclosure by Carroll et al. of at least one limitation of each of these six claims

For the reasons presented herein, the Court is respectfully requested to reverse the decision of the Board of Patent Appeals and Interferences and hold that claims 70, 71, and 75 are patentable over Carroll et al. (Pat. No. 5,517,194) under 35 U.S.C. § 102(e) and that claims 47, 56, and 57 are patentable over Carroll et al. (Pat. No. 5,517,194) under 35 U.S.C. § 103(a).

BPAI DECISION ON APPEAL

Paper No. 11

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte MICHAEL L. BEIGEL, NATHANIEL POLISH, STEVEN R. FRANK and ROBERT E. MALM

Appeal No. 2005-0171
Application No. 10/064,380

ON BRIEF

Before JERRY SMITH, BARRETT, and RUGGIERO, Administrative Patent Judges.
RUGGIERO, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on the appeal from the Examiner's rejection of claims 1-17, 20-25, 32, 36-45, 47-68, and 70-80.

The disclosed invention relates to an electronic identification system in which the identifying agency and the object to be identified cooperate in the identification process. More particularly, an interrogator (reader) is inductively coupled to a transponder (tag) in which the reader is associated with the identifying agency and the tag is associated with the object to be

identified. Two-way communication is provided between the reader and the tag through inductively-coupled coils. The reader drives its coils through capacitors at a driving frequency and the tag detects the reader's signal by way of the tag's inductively-coupled coil connected in parallel with a capacitor.

Claims 1 and 32 are illustrative of the invention and read as follows:

1. A reader for use with a tag that communicates data to the reader, the reader comprising:

a transformer having a plurality of windings, each winding having first and second terminals;

a coil driver having first and second output terminals;

two capacitors, each capacitor having first and second terminals, the first and second output terminals of the coil driver being connected to the first terminals of the capacitors, the second terminals of the capacitors being connected to the first and second terminals of a winding of the transformer;

a coil having first and second terminals connected respectively to the first and second end terminals of a winding of the transformer;

a data extractor for extracting data from the signal induced in the coil, the data extractor having first and second terminals connected respectively to first and second terminals of a winding of the transformer.

32. A reader for use with a tag that transmits a data sequence to the reader by repeating a message a plurality of times, the message comprising a preamble, a tag data group of T bits, and an error-detecting group of E bits, the preamble consisting of a sync sequence of S bits, the tag data group and the error-detecting

group possibly including false-sync sequences, the reader comprising:

a means for receiving the data sequence transmitted by the tag;

a means for detecting each sync sequence in the received data sequence;

a means for identifying the preamble;

a means for extracting the tag group from the received data sequence utilizing the identification of the preamble.

The Examiner relies on the following prior art:

McFarlane	3,223,779	Dec. 14, 1965
Kurusu	3,587,017	Jun. 22, 1971
Ogita et al. (Ogita)	4,278,980	Jul. 14, 1981
Chatelot	4,864,633	Sep. 05, 1989
Waraksa et al. (Waraksa)	4,942,393	Jul. 17, 1990
Buchele	5,276,910	Jan. 04, 1994
Carroll et al. (Carroll)	5,517,194	May 14, 1996 (filed Feb. 10, 1994)

Claims 20-24 stand rejected under 35 U.S.C. § 112, first paragraph, as being based on an inadequate disclosure. Claims 32 and 72 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Waraksa. Claims 36-40 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Buchele. Claims 70, 71, and 73-80 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Carroll. Claims 1, 3, 41 and 43 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Chatelot and Kurusu. Claims 1, 2, 4, 41, 42, 44, and 45 stand rejected under 35 U.S.C.

§ 103(a) as being unpatentable over the combination of Chatelot and Ogita. Claims 5-13, 25, 47-60, and 62-64 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Carroll alone. Claims 14-17, 61, and 64-68 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Carroll in view of McFarlane.

Rather than reiterate the arguments of Appellants and the Examiner, reference is made to the Brief (dated April 23, 2004, Paper No. 8) and Answer (mailed July 1, 2004, Paper No. 9) for the respective details.

OPINION

We have carefully considered the subject matter on appeal, the rejections advanced by the Examiner and the evidence of anticipation and obviousness relied upon by the Examiner as support for the prior art rejections. After reviewing and taking into consideration Appellants' arguments set forth in the Brief along with the Examiner's rationale in support of the rejections and arguments in rebuttal set forth in the Examiner's Answer, we affirm-in-part.

The rejection of claims 20-24 under the enablement requirement of the first paragraph of 35 U.S.C. § 112.

In order to comply with the enablement provision of the statute, the disclosure must adequately describe the claimed invention so that the artisan could practice it without undue experimentation. In re Scarbrough, 500 F.2d 560, 566, 182 USPQ 298, 305 (CCPA 1974); In re Brandstadter, 484 F.2d 1395, 1404, 179 USPQ 286, 293 (CCPA 1973); and In re Gay, 309 F.2d 769, 774, 135 USPQ 311, 316 (CCPA 1962). If the Examiner has a reasonable basis for questioning the sufficiency of the disclosure, the burden shifts to Appellants to come forward with evidence to rebut this challenge. In re Doyle, 482 F.2d 1385, 1392, 179 USPQ 227, 232 (CCPA 1973), cert. denied, 416 U.S. 935 (1974); In re Brown, 477 F.2d 946, 950, 177 USPQ 691, 694 (CCPA 1973); and In re Ghiron, 442 F.2d 985, 992, 169 USPQ 723, 728 (CCPA 1971). However, the burden is initially upon the Examiner to establish a reasonable basis for questioning the adequacy of the disclosure. In re Strahilevitz, 668 F.2d 1229, 1232, 212 USPQ 561, 563 (CCPA 1982); In re Angstadt, 537 F.2d 498, 504, 190 USPQ 214, 219 (CCPA 1976); and In re Armbruster, 512 F.2d 676, 677, 185 USPQ 152, 153 (CCPA 1975).

The Examiner has questioned the sufficiency of Appellants' disclosure in describing the specific weighted integrations set

forth in claims 20-24. After careful review of the arguments of record, however, we are in agreement with Appellants' position as stated in the Brief. As asserted by Appellants (Brief, pages 30-32), the Examiner, aside from a general allegation of insufficiency, has never specifically indicated how Appellants' disclosure would not be enabling with regard to the particular features recited in claims 20-24. We find no basis for the Examiner's conclusion that one of ordinary skill would not be able to implement, without undue experimentation, the claimed weighted integration functions, especially in view of Appellant's disclosure at paragraphs 56-62 of the specification, as well as the evidence presented in the Attachments I and II appended to the Brief, which had previously been submitted in the amendment filed October 29, 2003, Paper No. 5.

In view of the above, since we find that the Examiner has not established a reasonable basis for challenging the sufficiency of the instant disclosure with respect to claims 20-24, we will not sustain the rejection of claims 20-24 under the enabling clause of the first paragraph of 35 U.S.C. § 112.

The 35 U.S.C. § 102(b) rejection of claims 32 and 72 based on Waraksa.

Anticipation is established only when a single prior art reference discloses, expressly or under the principles of indecency, each and every element of a claimed invention as well as disclosing structure which is capable of performing the recited functional limitations. RCA Corp. v. Applied Digital Data Systems, Inc., 730 F.2d 1440, 1444, 221 USPQ 385, 388 (Fed. Cir.); cert. dismissed, 468 U.S. 1228 (1984); W.L. Gore and Associates, Inc. v. Garlock, Inc., 721 F.2d 1540, 1554, 220 USPQ 303, 313 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984).

With respect to the appealed independent claims 32 and 72, the Examiner attempts to read the various limitations on the disclosure of Waraksa. In particular, the Examiner directs attention to the illustration in Waraksa's Figure 9 illustration along with the accompanying description beginning at column 5, line 55 (and including column 9, lines 40-55) of Waraksa.

Appellants' arguments in response assert a failure of Waraksa to disclose every limitation in independent claims 32 and 72 as is required to support a rejection based on anticipation. In the arguments appearing at pages 38-40 of the Brief, Appellants' assertions focus on the contention that, in contrast to the claimed

invention, Waraksa does not disclose any structure which would detect "each sync sequence in the received data sequence," the data sequence "possibly including false-sync sequences."

After reviewing the Waraksa reference in light of the arguments of record, we are in general agreement with Appellants' position as expressed in the Brief. We agree with Appellants that Waraksa has no disclosure of any structure which would distinguish between a genuine sync sequence and a false-sync sequence since Waraksa avoids the possibility of false-sync sequences appearing in the data sequence by attaching a SYNC pattern to the beginning of the Miller encoded code word.

We recognize that the Examiner has taken the position (Answer, pages 10 and 11) that the "false-sync sequence" limitation is not a positive limitation and is in effect an alternative language limitation which need not be given patentable weight. We find no basis for the Examiner interpreting the claim language in this manner. The "false-sync sequence" language is indeed a positive limitation since it establishes conditions and an environment in which the claimed data sequence and preamble identifying functions must operate.

We further disagree with the Examiner (Answer, page 11) that the "false-sync sequence" language can be given no patentable

weight since such language appears only in the claim preamble and merely recites the intended use of a structure. Contrary to the Examiner's contention that the claim preambles merely recite intended use, the data sequence limitations appearing in the preambles of claims 32 and 72 are directly tied to the data sequence detecting and preamble identifying features recited in the body of the claims and, as discussed supra, establish conditions under which these functions must operate. As pointed out by Appellants (Brief, page 39), the sole reason for the claimed detecting and identifying limitations in the body of claims 32 and 72 is because of the need to process data sequences which could possibly contain false-sync sequences. Our reviewing court has stated in Bell Communications Research, Inc. V. Vitalink Communications Corp., 55 F.3d 615, 620, 34 USPQ2d 1816, 1820 (Fed. Cir. 1995) that:

> [A] claim preamble has the import that the claim as a whole suggests for it. In other words, when the claim drafter chooses to use both the preamble and the body to define the subject matter of the claimed invention, the invention is so defined.

Each of claims 32 and 72 refers in the body of the claim to the detecting of a data sequence and the identifying of a preamble of the data sequence. We thus regard the preamble recitations which describe the contents of the data sequence as providing

antecedent reference for the corresponding elements in the body of the claims, and limiting the claimed subject matter accordingly.

For the above reasons, since all of the claim limitations are not present in the disclosure of Waraksa, we do not sustain the Examiner's 35 U.S.C. § 102(b) rejection of independent claims 32 and 72.

The 35 U.S.C. § 102(e) rejection of claims 36-40 based on Buchele.

In making this rejection, the Examiner makes reference (Answer, page 5) to the driving circuitry including a bridge circuit of 4 FETs illustrated in Figure 2 of Buchele. With respect to claims 36 and 39, argued together by Appellants, we find no convincing arguments from Appellants that convince us of any error in the Examiner's position which asserts that the Figure 8 structure of Buchele discloses a capacitor coupled to a coil with driving circuitry including a bridge circuit of four FETs as claimed. To whatever extent Appellants' argument (id., at 49) that Buchele does not have a "high power PWM signal" at opposing transistor junctions may be correct, there is no such requirement appearing in claims 36 and 39.

We also agree with the Examiner, with respect to Appellants' argument based on In re Donaldson Co., 16 F.3d 1189, 29 USPQ2d 1845

(Fed. Cir. 1994) that Buchele's coupling structure does not include a transformer, that the Figure 2 embodiment of Appellants' disclosed coupling arrangement also does not include a transformer. It is also our view that the Examiner is correct in the assertion (Answer, page 14) that Appellants' Donaldson argument with respect to the driving circuit features of claim 36 is unpersuasive because of the presence of significant structure in the claim which modifies the "means for driving" claim language.

In view of the above discussion, since all of the claimed limitations are present in the disclosure of Buchele, the Examiner's 35 U.S.C. § 102(e) rejection of appealed claims 36 and 39 is sustained.

Turning to a consideration of the Examiner's 35 U.S.C. § 102(e) rejection of claims 37, 38, and 40, we note that, while we found Appellants' arguments to be unpersuasive with respect to the rejection of claims 36 and 39, we reach the opposite conclusion with respect to claims 37, 38, and 40. We agree with Appellants that the language of claim 37, upon which claim 38 depends, recites a bridge circuit which "comprises two series-connected P- and N-channel field effect transistors connected in parallel," and is therefore in direct contrast to the circuit structure of Buchele which discloses only n-channel devices. Since there is no response

by the Examiner to Appellants' arguments, we are constrained on the record before us to reverse the anticipatory rejection of claims 37 and 38.[1] Similarly, the rejection of claim 40 is also reversed since the Examiner has never explained how the circuitry disclosed by Buchele satisfies the language of claim 40 which requires, inter alia, "a two-winding transformer associated with each transistor."

The 35 U.S.C. § 102(e) rejection of claims 70, 71, and 73-80 based on Carroll.

In addressing the limitations set forth in independent claim 70, we note that the Examiner makes reference to the illustrations in Carroll's Figures 3 and 4B as disclosing the claimed alternating magnetic field embedding of a bit-timing clock signal. Appellants' arguments in response (Brief, pages 51-54) assert that, unlike the claimed invention in which a bit timing clock signal is embedded in an alternating magnetic field generated by the reader, the transponder 40, i.e., the tag, in Carroll embeds a clock signal in the carrier transmitted from the controller 10, i.e., the reader. According to Appellants (id., at 52), when Carroll's controller 10 receives a transmission from transponder 40, it extracts the bit

[1] Since the Examiner has not addressed the issue of obviousness to the skilled artisan of interchangeably using P- and N-channel devices according to particular circuit considerations, we have no such rejection before us and, accordingly, we decline to rule on the merits of such a rejection.

timing clock signal and then transmits data to the transponder utilizing the extracted bit timing signal, thereby avoiding the need to include a bit timing signal in its transmission.

After reviewing the Carroll reference in light of the arguments of record, we find ourselves in general agreement with the Examiner's position as stated in the Answer. As asserted by the Examiner (Answer, pages 14 and 15), to whatever extent Appellants are correct in their characterization of Carroll as originating the generation of a bit timing clock signal at the transponder, no such requirement is set forth in claim 70 which merely requires the embedding of a bit timing clock signal in an alternating magnetic field generated by the reader. We agree with the Examiner that the alternating magnetic field generated from the reader in Carroll and received at element 58 in Carroll's Figure 3 transponder, the output of which is a clock signal input to timing control 60, has embedded therein a bit timing clock signal as claimed, regardless of the fact that such bit timing clock signal may have ultimately originated in the transponder.

The Examiner makes a similar rejection with respect to independent claim 71 which differs in one respect from claim 70 by reciting the generation of a bit-timing clock signal. We again find ourselves in agreement with the Examiner (Answer, page 15)

that the claimed clock signal generating feature is met by the encoder 70 in the transponder of Carroll since the body of the claim does not require that the clock signal generation originate at the reader.

With regard to the clock signal generation feature, claim 71 also differs from claim 70 by including in the claim preamble language which recites that a bit timing signal generated by the tag is synchronized with a bit timing signal "originating with the interrogator." Although we disagreed with the Examiner's treatment of claim preamble language with respect to previously discussed claim 32 and 72, we agree with the Examiner that the language of claim 71 does not require that limitations in the preamble be given patentable weight. A review of the limitations in claim 71 reveals that a step of "generating a bit-timing clock signal" (our emphasis) is set forth. There is no clear indication or requirement that such a bit-timing clock signal corresponds to the bit-timing clock signal referenced in the preamble. In other words, the preamble of claim 71 which sets forth a specific manner in which an interrogated tag responds to an interrogation, is a mere intended use of the claimed method of interrogating a tag set forth in the body of the claim.

We also sustain the Examiner's rejection of independent claim 75 based on Carroll. Appellants reiterate their contention (Brief, pages 73 and 74) that Carroll does not disclose the embedding of a bit-timing clock signal in the alternating magnetic field generated at the reader. For all of the reasons discussed previously, we find such argument to be unpersuasive since there is no claimed requirement that the bit-timing clock signal originate at the reader. We also find no argument from Appellants that would convince us of any error in the Examiner's position (Answer, page 18) that Carroll discloses the control of the start of a transmitted bit sequence by a bit-timing signal since the disclosed transmitted bit sequence follows the bit-timing signal (e.g., Carroll, Figure 4A).

Further, with respect to claims 70, 71, and 75, we find to be unpersuasive Appellants' arguments which assert that the claims are set forth in step-plus-function format and that the Examiner has not properly interpreted the limitations of the appealed claims in accordance with the decision in In re Donaldson, 16 F.3d 1189, 1191, 29 USPQ2d 1845, 1848-49 (Fed. Cir. 1994). The Federal Circuit has cautioned that, in order for elements in a method claim to be construed as step-plus-function limitations, steps plus function without acts must be present. "If we were to construe

every process claim containing steps described by an 'ing' verb, such as passing, heating, reacting, transferring, etc., into a step-plus-function, we would be limiting process claims in a manner never intended by Congress." See O.I. Corp. v. Tekmar, 115 F.3d 1576, 1583, 42 USPQ2d 1777, 1782 (Fed. Cir. 1997).

The Federal Circuit has also recognized, as is the case here, that the absence of explicit "step for" language in the claims does not automatically prevent a limitation from being construed as a step-plus-function limitation. "[C]laim elements without express step-plus-function language may nevertheless fall within Section 112, Para. 6 if they merely claim the underlying function without recitation of acts for performing that function. See Seal-Flex Inc. v. Athletic Track and Court Construction, 172 F.3d 836, 850, 50 USPQ2d 1225, 1234 (Fed. Cir. 1999). The Court in Seal-Flex, 172 F.3d at 849, 50 USPQ2d at 1234 provided guidance as to how to interpret process claims that may lack explicit step-plus-function language as follows:

> In general terms, the "underlying function" of a method claim element corresponds to *what* that element ultimately accomplishes in relationship to what the other elements of the claim and the claim as a whole accomplish. "Acts," on the other hand, correspond to *how* the function is accomplished. Therefore, claim interpretation focuses on what the

> claim limitation accomplishes, i.e., its underlying function, in relation to what is accomplished by the other limitations and the claim as a whole. (Emphasis in original).

With the above discussion in mind, it is our view that the underlying function set forth in claims 70 and 71, and what is accomplished by the claim as a whole, is the interrogation of a tag. Further, it is our opinion that, contrary to Appellants' contention (Brief, pages 55 and 60), the method steps of "embedding a bit-timing clock signal" (claim 70) and "generating a bit-timing clock signal" (claim 71) do not set forth "functions" but, rather recite "acts" which, when considered with the other method steps such as "generating an alternating magnetic field," "embedding data," and "extracting data," describe how the underlying function of tag interrogation is performed. We take a similar view with respect to method claim 75 and consider the underlying function to be the responding by a responder (tag) to the data transmitted from the reader. Similar to the discussion with regard to claims 70 and 71, we consider the method step of "generating a bit-timing clock signal" to merely recite an "act" which, when considered with the other method steps, describes how the underlying function of tag response to transmitted data from a reader is performed.

We do not sustain, however, the Examiner's rejection of independent claim 76 (nor its dependent claim 79) which, in

contrast to claim 75 discussed supra, contains a positive limitation in the body of the claim that the bit-timing clock signal generated by the responder is synchronized to the bit-timing clock signal "originating with the interrogator." We do not disagree with the Examiner (Answer, page 19) that the sync generator 70 in the transponder of Carroll is synchronized to the received clock signal from the interrogator. As pointed out by Appellants (Brief, pages 77 and 78), however, the received bit-timing clock signal received at the transponder in Carroll from the interrogator originates in the transponder (which the interrogator then uses to transmit data to the transponder), and not the interrogator as claimed.

Turning to a consideration of the Examiner's 35 U.S.C. § 102(e) rejection, based on Carroll, of independent claim 73, which includes a limitation directed to the maintaining of resonance of the claimed resonating circuit, we find ourselves in agreement with Appellants' arguments at pages 62-64 of the Brief. In addressing the claimed resonance maintaining feature, the Examiner relies on the principle of inherency by asserting (Answer, page 16) that "[t]his feature is inherent to any receiver that is attempting to receive data on a carrier ...."

Although the Examiner contends that Appellants have ignored the Examiner's evidence that supports the assertion of inherency, our review of the record before us reveals no such evidence forthcoming from the Examiner. To establish inherency, evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference and would be recognized as such by persons of ordinary skill. In re Robertson, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999), citing Continental Can Co. v. Monsanto Co., 948 F.2d 1264, 1268, 20 USPQ2d 1746, 1749 (Fed. Cir. 1991). "Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." Id. citing Continental, 948 F.2d at 1269, 20 USPQ2d at 1749.

In view of the above discussion, since all of the claim limitations are not present in the disclosure of Carroll, we do not sustain the Examiner's 35 U.S.C. § 102(e) rejection of independent claim 73, nor of claim 78 dependent thereon.[2]

We also do not sustain the Examiner's 35 U.S.C. § 102(e) rejection, based on Carroll, of independent claims 74 and 77 (and

[2] We make the observation that the language "the sequence of bits" at line 6 of claim 73 lacks antecedent basis.

its dependent claim 80), each of which includes the feature of "performing at least one weighted integration" of a signal derived from an alternating magnetic field generated by an interrogator.[3] Although the Examiner asserts (Answer, page 17) that the "divide-by-64" operation performed by timing control circuit 60 in Carroll is a "weighted integration" as claimed, we find no support for such a conclusion. As pointed out by Appellants (Brief, page 68), the timing control circuit 60 in Carroll is merely a synchronous counter and has little relevance to the claimed performance of a weighted integration of a received signal which, at a minimum, would involve the multiplication by a weighting function of a received signal during a bit period and the integration of the result.

The 35 U.S.C. § 103(a) rejection of claims 1, 3, 41, and 43 as being unpatentable over Chatelot in view of Kurusu.

Independent claims 41 and 43 are directed to the particulars of a coupling arrangement for the reader and tag circuitry which ties together a transformer, a coil, two capacitors and a coil driver. In making the obviousness rejection, the Examiner asserts

[3] The copy of the claims appearing in the appendix to the Brief mistakenly has claim 80 dependent on claim 7.

(Answer, pages 6, 7, 20, and 21) the obviousness to one of ordinary skill to include transformers, as taught by Kurusu, in the system of Chatelot, relying on the general principle that transformers are well known to provide an isolation feature that serves to protect circuit elements from damage.

Although we do not dispute the Examiner's generalized assertion that transformers can be used to provide isolation among circuit elements, we agree with Appellants (Brief, page 95) that the Examiner has not established proper motivation for the proposed combination of Chatelot and Kurusu. The disclosure of Chatelot is directed to coil and coupling circuitry for communication between a tag and a reader which, as recognized by the Examiner, lacks any disclosure of a transformer coupling. On the other hand, Kurusu is directed to an overvoltage protection circuit which, although including a transformer 17, utilizes the transformer only as a coupling connection from filter 13 to transistor 16. Given the fact that Chatelot and Kurusu are directed to different problems in the communication art, with disparate solutions to such problems, it is our view that any attempt to combine them could come only from Appellants' own disclosure and not from any teaching or suggestion in the references themselves.

Further, even if proper motivation were found to exist for the proposed combination of Chatelot and Kurusu, we find no indication from the Examiner as to how and in what manner the references would be combined to arrive at the specific combination set forth in appealed independent claims 1 and 41. In our view, the Examiner has combined the transformer connection teachings of Kurusu with the reader and tag communication circuitry disclosure of Chatelot in some vague manner without specifically describing how the teachings would be combined to arrive at the claimed invention. This does not persuade us that one of ordinary skill in the art having the references before her or him, and using her or his own knowledge of the art, would have been put in possession of the claimed subject matter.

In view of the above discussion, since all of the claim limitations are not taught or suggested by the applied prior art, it is our opinion that the Examiner has not established a prima facie case of obviousness, based on the combination of Chatelot and Kurusu, with respect to appealed independent claims 1 and 41. Therefore, we do not sustain the Examiner's 35 U.S.C. § 103(a) rejection of claims 1 and 41, nor of claims 3 and 43 dependent thereon.

The 35 U.S.C. § 103(a) rejection of claims 1, 2, 4, 41, 42, 44, and 45 as being unpatentable over Chatelot in view of Ogita.[4]

We do not sustain this rejection for reasons similar to those discussed supra with respect to the Examiner's obviousness rejection based on Chatelot and Kurusu. As with the Examiner's proposed combination of Chatelot and Kurusu, we simply find no indication as to how and in what manner the transformer circuitry of Ogita, which connects tuning capacitor 34 to amplifier 37, would be combined with the tag and reader circuitry of Chatelot to arrive at the specific combination set forth in independent claims 1 and 41. Similarly, as with the rejection based on Chatelot and Kurusu, we find no evidence that would support the Examiner's contention that one of ordinary skill would look to the disclosure of Ogita, which suggests the use of a transformer to provide impedance matching between an antenna and an amplifier, to solve a problem associated with coupling a driving signal to a coil in a tag and reader communication circuit as in Chatelot.

[4] The Examiner's statement of the grounds of rejection (Answer, page 7) apparently mistakenly omits independent claims 41 and 43 since the Office action mailed January 15, 2004, Paper No. 6, as well as the arguments at page 21 of the Answer indicate they are to be included.

The 35 U.S.C. § 103(a) rejection of claims 5-13, 25, 47-60, and 62-64 as being unpatentable over Carroll.[5]

We consider first the Examiner's rejection of independent claim 5 which includes, inter alia, connecting circuitry for a reader which includes a capacitor coupled to a driving coil. In addressing this limitation, the Examiner, while recognizing that Carroll lacks a disclosure of a capacitor coupled to a coil in the reader (controller) 10 circuitry of Carroll, nevertheless directs attention to the tuning capacitor 44 in the tag (transponder) 40 of Carroll. According to the Examiner (Answer, pages 8, 21, and 22), the skilled artisan would have been motivated and found it obvious to include a tuning capacitor in the reader circuitry of Carroll since Carroll teaches the use of a capacitor to provide tuning in the tag circuitry.

After reviewing the arguments of record, we are in general agreement with Appellants' assertions at pages 118 and 119 of the Brief. In particular, we find to be misplaced the Examiner's argument (Answer, page 21) that Appellants have provided no evidence as to why a tuning capacitor would not be desirable in the reader of Carroll. To the contrary, it is the Examiner who has the

[5] As noted by Appellants (Brief, page 2), and verified by the Examiner's arguments (Answer, page 24), claim 49 was apparently mistakenly omitted from the statement of the grounds of rejection at page 7 of the Answer.

burden of establishing, by convincing arguments and/or evidence, a prima facie case of obviousness. With regard to the issue of obviousness in the present factual situation, we find particularly compelling Appellants' arguments (Brief, page 119) that, although Carroll found the need to use a tuning capacitor in the tag circuitry 40, he found no such need and did not do so in the reader circuitry 10.

Accordingly, since all of the claim limitations are not taught or suggested by the applied prior art, it is our opinion that the Examiner has not established a prima facie case of obviousness with respect to appealed independent claim 5. Therefore, we do not sustain the Examiner's 35 U.S.C. § 103(a) rejection of independent claim 5, nor of claims 6-13 dependent thereon.

Turning to a consideration of the Examiner's obviousness rejection of independent claim 25 based on Carroll, we do not sustain this rejection as well. We agree with Appellants that, in contrast to the requirements of claim 25, Carroll does not disclose the use of frequency shift keying (FSK) to transmit data from the transponder/tag 40 to the reader/controller 10 but, rather, utilizes a phase shift keying technique (PSK). Further, to whatever extent the Examiner is suggesting the interchangeability

of FSK and PSK transmission techniques, we find no evidence forthcoming from the Examiner that would support such an assertion.

We do agree with the Examiner, however, that the limitations of independent claims 47 and 56 are taught by Carroll. Appellants' arguments in response (Brief, pages 140, 151, and 152) refer to similar arguments made with respect to the Examiner's 35 U.S.C. § 102(e) rejection of claim 70 based on Carroll, which arguments we found to be unpersuasive as discussed supra. As discussed previously, it is our view that the transponder 40 in Carroll receives from the reader 10 a transmitted signal which has embedded therein a bit-timing clock signal, regardless of the fact that such bit-timing clock signal may have ultimately originated at the transponder. Similarly, Appellants' argument that Carroll does not receive a bit-timing clock signal originating at the reader upon which the transponder synchronizes its own bit-timing clock signal is without merit since the claim language does not require that the bit-timing clock signal originate at the reader. We further find no error in the Examiner's position (Answer, pages 23 and 24) that the sync element 70 in the transponder 40 of Carroll synchronizes the transponder bit-timing clock signal with the received periodic bit signal from the reader with start/end points which embed the bit-timing signal into the driving signal.

We do not sustain the Examiner's 35 U.S.C. § 103(a) rejection, based on Carroll, of dependent claims 48-50, each of which contains limitations directed to the weighted integration feature. As previously discussed with respect to the Examiner's 35 U.S.C. § 102(e) rejection, based on Carroll, of independent claims 74 and 77, we find no support on the record before us that the timing control circuit 60 or the address register 62 perform a weighted integration operation as asserted by the Examiner.

We also do not sustain the Examiner's 35 U.S.C. § 103(a) rejection, based on Carroll, of dependent claims 51-55, which are directed to the particulars of a bit-identifying operation and the adjustment of bit-start indicators. As asserted by Appellants (Brief, pages 148-150), the Examiner has never attempted to show how the disclosure of Carroll teaches or suggests the claimed limitations, and, accordingly, no prima facie case of obviousness has been established.

We do, however, sustain the Examiner's 35 U.S.C. § 103(a) rejection, based on Carroll, of dependent claims 57-60, which are directed to the particulars of the phase-shift coding technique used for transmitting data from the tag to the reader. As asserted by the Examiner (Answer, page 25), the language of claims 57-60 simply does not require the interpretation urged by Appellant at

pages 153-158 of the Brief. We find no error in the Examiner's stated position that the phase-shift coding procedure disclosed by Carroll, in which a "0" is transmitted during a first phase of a bit portion of a signal and a "1" is transmitted during a second phase of the bit portion of the signal, satisfies the requirements of the claims.

Turning to a consideration of the Examiner's 35 U.S.C. § 103(a) rejection, based on Carroll, of dependent claims 62-64, we do not sustain this rejection for essentially the same reason as previously discussed with regard to independent claim 25. As with claim 25, dependent claims 62-64 are directed to a frequency-shift keying procedure for transmitting data from the tag to the reader. In our view, regardless of the merits of Appellants' arguments directed to the significance of the presence of "periodic signal" language in claims 62-64, the disclosure of Carroll, which utilizes phase-shift keying to transmit data from the transponder/tag 40 to the reader/controller 10, does not satisfy the frequency-shift keying requirements of claims 62-64.

The 35 U.S.C. § 103(a) rejection of claims 14-17, 61, and 64-68 as being unpatentable over Carroll in view of McFarlane.

Dependent claims 14-17, 61, and 64-68 are directed to the feature of transmitting data between a reader and tag utilizing combined frequency-shift and phase-shift coding techniques. In addressing the limitations of these claims, the Examiner adds McFarlane, which describes a combined frequency-shift and phase-shift keying system, to the disclosure of Carroll.

After reviewing the McFarlane reference in light of the arguments of record, we find Appellants' arguments to be persuasive. With respect to claims 14 and 61, we agree with Appellants that, although the Examiner asserts (Answer, page 26) correspondence between the illustrated system in Figure 2a of McFarlane and that claimed, we fail to find any support for such a conclusion. As pointed out by Appellants, the fact that McFarlane may disclose that a driving signal may have one of two frequency values and one of two phase values, does not satisfy the claim language which requires that the phase of a driving signal have one of two frequency values and one of two phase values.

Similarly, it is our view that McFarlane's disclosure of a combined frequency-shift and phase-shift keying system does not disclose the particular features of claims 15-17 and 64-68 which

set forth varying techniques of applying FSK/PSK modulation techniques to a periodic signal and then using the modulated periodic signal to modulate the driving signal.

Accordingly, since, even if combined, the collective teachings of Carroll and McFarlane would not satisfy the claimed limitations, a prima facie case of obviousness has not been established, and, therefore, the Examiner's obviousness rejection of claims 14-17, 61, and 64-68 based on the combination of Carroll and McFarlane is not sustained.

In summary, we have not sustained the Examiner's 35 U.S.C. § 112, first paragraph, rejection of claims 20-24, nor the 35 U.S.C. § 102(b) rejection of claims 32 and 72 based on Waraksa. With respect to the 35 U.S.C. § 102(e) rejection of claims 36-40 based on Buchele, we have sustained the rejections of claims 36 and 39, but have not sustained the rejections of claims 37, 38, and 40. With respect to the 35 U.S.C. § 102(e) rejection of claims 70, 71, and 73-80 based on Carroll, we have sustained the rejection of claims 70, 71, and 75, but have not sustained the rejection of claims 73, 74, and 76-80. We also have not sustained the 35 U.S.C. § 103(a) rejection of claims 1, 3, 41, and 43 based on the combination of Chatelot and Kurusu, nor the 35 U.S.C. § 103(a)

rejection of claims 1, 2, 4, 41, 42, 44, and 45 based on the combination of Chatelot and Ogita. With respect to the 35 U.S.C. § 103(a) rejection of claims 5-13, 25, 47-60, and 62-64 based on Carroll, we have sustained the rejection of claims 47 and 56-60, but have not sustained the rejection of claims 5-13, 25, 48-55, and 62-64. Lastly, we have not sustained the 35 U.S.C. § 103(a) rejection of claims 14-17, 61, and 64-68 based on the combination of Carroll and McFarlane. Accordingly, the Examiner's decision rejecting claims 1-17, 20-25, 32, 36-45, 47-68, and 70-80 is affirmed-in-part.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a)(1)(iv) (effective September 13, 2004; 69 Fed. Reg. 49960 (August 12, 2004); 1286 Off. Gaz. Pat. and TM Office 21(September 7, 2004)).

AFFIRMED-IN-PART

JERRY SMITH
Administrative Patent Judge

LEE E. BARRETT
Administrative Patent Judge

JOSEPH F. RUGGIERO
Administrative Patent Judge

BOARD OF PATENT APPEALS AND INTERFERENCES

JFR/dal

Appeal No. 2005-0171
Application No. 10/064,380

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BPAI DECISION ON REQUEST FOR REHEARING

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Ex parte MICHAEL L. BEIGEL, NATHANIEL POLISH, STEVEN R. FRANK and ROBERT E. MALM

Appeal No. 2005-0171
Application No. 10/064,380

ON BRIEF

Before JERRY SMITH, BARRETT, and RUGGIERO, Administrative Patent Judges.

RUGGIERO, Administrative Patent Judge.

ON REQUEST FOR REHEARING

Appellants request that we reconsider that portion of our decision of June 27, 2005 wherein we sustained the Examiner's 35 U.S.C. § 102(e) rejection of claims 36 and 39 based on the Buchele reference, the 35 U.S.C. § 102(e) rejection of claims 70, 71, and 75 based on the Carroll reference, and the 35 U.S.C. § 103(a) rejection of claims 47 and 56-60 based on the Carroll reference.

Initially, with respect to claim 36, we find ourselves in agreement with Appellants that the Examiner has not properly interpreted the "means for coupling the capacitor(s) to the coil" limitation of the claim in accordance with the decision in In re Donaldson, 16 F.3d 1189, 1191, 29 USPQ2d 1845, 1848-49 (Fed. Cir. 1994. As alluded to by Appellants, in order to properly interpret a claimed means-plus-function element, the Examiner's burden of establishing a prima facie case involves at least two requirements. Initially, the Examiner must provide evidence that the structure identified in a prior art reference actually performs the function set forth in the claims. Further, the Examiner is required to show whether the identified prior art structure which performs such a function is equivalent to the structure disclosed in Appellants' specification.

On reconsideration of the Examiner's stated position in light of Appellants' arguments in the Request, it is apparent that the Examiner's analysis satisfies neither of the above requirements. As argued by Appellants, the capacitor coupling means of claim 36 must be interpreted as corresponding to the

structure disclosed in Appellants' specification, i.e., a structure, as illustrated in Appellants' Figure 2, in which one capacitor terminal connects to a coil terminal and the other capacitor terminal connects to a driver terminal. We agree with Appellants that the Examiner has failed to provide any evidence, other than the mere opinion, that the structure disclosed by the Buchele reference is an equivalent to the claimed coupling means.

As asserted by Appellants, the capacitor 160 in Buchele, which is merely connected across the DC power source 170 for the driver 110, cannot be reasonably interpreted as providing a coupling of the capacitor 160 to coil 190. Further, It is further our opinion that, even assuming arguendo that the capacitor connecting structure of Buchele could be interpreted as performing the claimed coupling function set forth in means-plus-function format, the Examiner has failed to meet the burden of showing how such structure is equivalent to Appellants' disclosed structure in the specification. In this regard, the disclosure of the Buchele reference simply does not provide the factual basis necessary to support a finding that the capacitor and its

associated connecting circuit structure disclosed therein are of the equivalent structure and arranged in an equivalent manner to that described in Appellants' disclosure. Accordingly, the Examiner's 35 U.S.C. § 102(e) rejection of claim 36, as well as claim 39 dependent thereon, based on the Buchele reference, is reversed.

We would point out that, although our reversal of the Examiner's rejection of claims 36 and 39 is based on a lack of evidence on the record before us, this is not to be taken as an indication that no evidence exists to support the Examiner's position. Further, although we have found that Buchele does not disclose an equivalent structure under 35 U.S.C. § 102, MPEP § 2183 also notes that the Examiner should consider whether the prior art supports a rejection under 35 U.S.C. § 103. We have made no findings as to whether the claimed coupling means would have been obvious to the artisan within the meaning of 35 U.S.C. § 103. We leave it to the Examiner to determine in the first instance whether a rejection under 35 U.S.C. § 103 is appropriate based on Buchele or any other prior art.

With respect to the 35 U.S.C. § 102(e) rejection of claims 70, 71, and 75 based on the Carroll reference, and the 35 U.S.C. § 103(a) rejection of claim 47 and 57 based on the Carroll reference, we have reconsidered our original decision in light of Appellants' comments in the Request for Rehearing, and we find no error therein. We, therefore, decline to make any changes in our prior decision which affirms these rejections for the reasons which follow.

Regarding claim 70, Appellants contend (Request, pages 4-6) that our earlier decision erred in concluding that Carroll's generated alternating magnetic field has a bit-timing clock signal embedded therein. According to Appellants, the output of Carroll's element 58 does not contain a bit-timing clock signal and, further, there is no bit-timing clock signal generated in the controller 10. We do not find this persuasive. We find no error in the Examiner's line of reasoning that concluded that the output of Carroll's element 58 which provides a clock signal input to timing control 60 has embedded therein a bit-timing clock signal as claimed. It is noteworthy that Appellants admit (id., at 5) that the output of Carroll's divide-by-64 timing control element 60 is a bit-timing control signal.

It is this control signal that Carroll's transponder 40 transmits to controller 10, which extracts this bit-timing data and utilizes it to develop a bit-timing signal which is embedded in the data transmitted (Carroll, Figure 4B) from the controller 10 to the transponder 40. As we stated in our earlier decision, there is no claimed requirement that the bit-timing control signal originate in Carroll's controller as argued by Appellants.

With respect to claim 71, we also find no error in our original decision which concluded that language in the claim preamble which recites that a bit-timing clock signal originates with the interrogator be given no patentable weight since there is no clear indication that the generation of a bit-timing clock signal in the body of the claim refers back to the claim preamble. We don't necessarily disagree with Appellants' argument (Request, pages 8 and 9) that there must be an initial establishment of interrogator-tag communication which originates in the interrogator. It is apparent, however, from our reading of Carroll that, in the ongoing communication between the controller (interrogator) and the transponder (tag), the

controller is responding to bit-timing control signals generated at the transponder by utilizing such signal information and embedding it in the signals transmitted back to the transponder (Carroll, Figure 4B).

Similarly, we find no error in our original decision affirming the Examiner's 35 U.S.C. § 102(e) rejection of claim 75 based on Carroll. Again we refer to the illustration in Carroll's Figure 4B along with the accompanying disclosure at column 16, lines 1-10 which describes the transmission of a command word 112 from the controller 10 to transponder 40 which incorporates, i.e., embeds, a synchronization block 114. Further, as described at column 16, lines 46-52 of Carroll, the sending of the command word 112 from the controller to the transponder is synchronized with the bit timing of the configuration word 100 from the transponder.

We are also unpersuaded by Appellants' argument asserting that our original decision misinterpreted Judge Rader's concurring opinion in the Seal-Flex case as it relates to an In re Donaldson analysis of method claims. We find no error in our finding that the method steps set forth in method claims 70, 71, and 75 recite "acts" and not "functions" which would invoke the

sixth paragraph of 35 U.S.C. § 112 requiring that such claim limitations be interpreted as step-plus-function limitations. We find no basis for Appellants' assertion that the method steps of claims 70, 71, 75 are analogous to the step of "adhering the mat to the foundation" which Judge Rader's opinion in the Seal-Flex case suggested would set forth a function which would be governed by the sixth paragraph of 35 U.S.C. § 112. We remain of the opinion that the method steps of, for example, "embedding a bit timing clock signal' (claim 70) and "generating a bit-timing clock signal" (claims 71 and 75) do not recite "functions" but rather recite "acts" which describe how the underlying function of tag interrogation is performed.

We also find to be without merit Appellants' assertion of error in our original decision affirming the Examiner's 35 U.S.C. § 103(a) rejection of claims 47 and 56 based on Carroll. Appellants have not attacked our agreement with the Examiner's line of reasoning asserting the obviousness to the skilled artisan of including a tuning capacitor in the circuitry of Carroll. Rather, Appellants' arguments in the Request reiterate those made with respect to claims 70, 71, and 75 which contend

that there is no bit-timing clock signal embedded in the signal received from the controller by the transponder in Carroll, arguments we found to be unpersuasive for all of the reasons discussed supra.

With respect to claim 57, we also find no error in the conclusion reached in our original decision that the Examiner reasonably interpreted the broadly set forth claim language as not distinguishing over the Manchester encoded phase shift keying technique used by Carroll in which "zeros" and "ones" are transmitted in different bit portions of a signal. We do agree with Appellants, however, that the Examiner improperly grouped claims 58-60 with claim 57 and pointedly ignored the separate arguments of Appellants with respect to these claims in the Brief. Since there is no evidence of record presented by the Examiner as to what teachings or suggestions in Carroll would support the Examiner's 35 U.S.C. § 103(a) rejection as related to the particular driving signal modulation features of these claims, we are constrained to reverse the Examiner's rejection of claims 58-60.

CONCLUSION

Appellants' request for rehearing is granted to the extent that we have reconsidered our prior decision in light of Appellants' arguments. The Examiner's 35 U.S.C. § 102(e) rejection of claims 36 and 39 and the 35 U.S.C § 103(a) rejection of claims 58-60 are hereby reversed. We are not otherwise persuaded of any errors in our prior decision and maintain the rejections of claims 47, 56, 57, 70, 71, and 75. Thus, the request for rehearing is GRANTED-IN-PART.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a)(1)(iv)(effective September 13, 2004)..

REHEARING/GRANTED-IN-PART

JERRY SMITH Administrative Patent Judge	)
LEE E. BARRETT Administrative Patent Judge	) BOARD OF PATENT) APPEALS AND
JOSEPH F. RUGGIERO Administrative Patent Judge	) INTERFERENCES

JFR/ce

Appeal No. 2005-0171
Application No. 10/064,380

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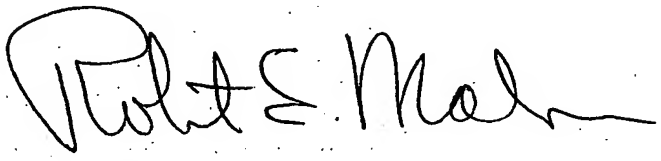
PROOF OF SERVICE

I hereby certify that on March 1, 2007, I caused two copies of the foregoing document is being mailed by first class mail, postage prepaid, to the attorneys for appellee NATHAN K. KELLEY and THOMAS W. KRAUSE at OFFICE OF THE SOLICITOR, P.O. Box 15667, Arlington, Virginia 22215.

I further certify that on March 1, 2007, I caused twelve copies of the foregoing document to be filed by first class mail, postage prepaid, with the Clerk of Court, United States Court of Appeals for the Federal Circuit, 717 Madison Place, N.W., Washington, D.C. 20439.



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